October 1941

# CONSUMERS' RESEARCH

# Bulletin


## Contents for October 1941

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Symbols used to indicate sources of data and bases of ratings:

**A**—recommended on basis of quality

**AA**—regarded as worthy of highest recommendation

**B**—intermediate with respect to quality

**C**—not recommended on basis of quality

cr—information from Consumers' Research's own tests or investigations

**1, 2, 3**—relative prices, **1** being low, **3** high. Note that price and quality are completely differentiated in CR's listings; *a quality judgment is independent of price.*

40, 41—year in which test was made or information obtained or organized by the staff of Consumers' Research.

* * *

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Note: For a detailed account of CR's early history, policies, and information as to the answering of special inquiries about commodities, subscribers are urged to read the *Introduction to Consumers' Research*, which is sent on request to anyone without charge.

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# Portable Radio Receivers

TO THE YOUNGER GENERATION at least, the portable radio appears to have climbed almost into the necessity class. At any rate, trade reports state that by December of last year 150,000 sets of portable or miniature type had been sold since the beginning of summer. At the beach, at picnics, in the country, and even in the spectators' stands at sporting events, portable radios can be seen and (unfortunately, at times) heard. Sales of sets for use by men in military and naval training have also increased the number in use. So common have the small sets become that complaints against their use are beginning to appear in the newspapers.

The miniature or "personal" portable has been receiving most of the emphasis in the advertising of portable receivers. These small sets, many of them no larger than a good-sized camera, have received wide acceptance by the consumer in spite of the fact that they have the most obvious deficiencies of sensitivity, and are also very deficient in fidelity of reproduction, so that it seems hard at times to explain their achieving any degree of popularity. Evidently the desire for a compact, lightweight, and relatively inconspicuous portable has outweighed the very great advantages of better tone quality and performance provided by the larger types.

### Monthly Battery Cost Very High for Miniature or "Personal" Portables

With but two exceptions, makers of the miniature portables in CR's test used the same types and arrangements of tubes, and all used the same size of "B" battery, a small 67½-volt type such as the *Eveready* "Mini-Max," No. 467. This battery, having a list price of $2.50, is estimated to have a life of 40 to 60 hours in use in these sets under average conditions. The "A" battery, consisting of standard 1½-volt flashlight cells, is estimated to have a life of 3 to 5 hours of total use (in intermittent service) for sets using a single cell, 10 to 15 hours for sets using 2, and about 22 to 30 hours for sets using 3 cells. Battery life is dependent to a considerable extent on the length of the periods of use and on the time the batteries are allowed to recuperate between use-periods. There is also bound to be very wide disparity in life performance, depending upon freshness of the batteries, temperature conditions under which they are stored and used, and variations in the materials in them and their processing. It can be estimated that, if used 2 hours a day, the sets having one "A" cell might require a monthly outlay for "A" and "B" units of at least $3.70; those with two "A" cells, $3.30; and those with three "A" cells, $3.10. Increase in the number of hours of use per day would account for a rapid increase in the monthly outlay for batteries. Clearly, then, the cost of operation of the miniature portables will be so large as to prohibit their use by many consumers; and, no doubt, unawareness of this fact has accounted for the purchase of these sets by many persons who would not have wished to own one had they known they might need to expend a **dollar a week for maintenance,** or nearly that much.

These sets have other serious disadvantages. Tube burn-outs are peculiarly likely to occur. It is difficult even to remove the tubes in some cases, and servicemen often charge extra for repairing these sets, since the extreme compactness of their arrangement gives the serviceman much extra trouble in getting at defective parts. The fairly rough treatment which sets are likely to receive in average use is also a factor which will account for more frequent and more costly repairs than would be required for a set which has been in the same place month after month.

### Some Features of Miniature Sets Listed

Of the very small sets in the test that may be classed as miniature models, the *General Electric*, Model LB-603, the Automatic Radio Manufacturing Company's *Tom Thumb* model, and the *Admiral Bantam*, Model 29-G5, were of the "3-way" type—could be operated on batteries or from either a-c or d-c house current. Power-line operation would tend to conserve battery life, but since the wise buyer at least would buy such small sets only or primarily for use away from power lines, the feature might not be so important or helpful as the advertising and sales promotion would indicate. At any rate, for use at home, a standard table-model set (if something reasonably portable is

wanted) would be much more satisfactory both as to performance and economy of operation. Also to be taken into account is the undesirability of the ac-dc circuit used in the "3-way" sets when considered from a safety standpoint (see later discussion of this factor under *Electrical Shock Hazard*). The *Tom Thumb* model, in addition to being of the "3-way" type, had provision for "recharging" the conventional dry batteries from the house current. This method is claimed to increase the life of the batteries from 2 to 4 times. From limited data at hand, these figures would appear to be approximately correct. However, while dry-battery recharging is practicable, it is not a foolproof process and will work satisfactorily **only** if the set manufacturer's directions are followed closely and the following points kept in mind. The most important elements in successful recharging of dry batteries are: (1) Recharging following use of the battery must be prompt. (2) Periods of use or discharge of the battery before recharging should be relatively short. (3) Recharging must not be too protracted, else cells will be dried out and spoiled.

### The Regular or Large-Size Portable Receivers

There could be no doubt at all that the larger portable sets included in CR's test gave, with one exception, performance much superior to the miniature portables. Most of the larger portables were of the "3-way" type, two having provision for recharging batteries. The *Automatic P-60* used conventional dry cells subject to some degree of recharging as previously mentioned in the discussion of miniature portables, while the *General Electric*, Model LB-530, used a special 2-volt non-spillable storage battery. The necessary "B" voltages for operation of this *GE* set were obtained through vibrator and step-up transformer, a system similar to that used in automobile radios. This is an interesting idea making for very decided economy in battery supply, since electrical energy from the power lines is obtained at a very minute fraction of the cost of electrical energy obtained from dry cells, but unfortunately its execution in the *General Electric* set was unsatisfactory in a number of respects.

### Battery Life Expectancy of Large Portables

As has already been noted, an accurate estimation of life of dry batteries as used in radio sets cannot be made, for there are so many and so important variables involved, among which are, of course, the listening habits of the user.

The life of batteries in large portables is much greater than that in the small ones, and it is estimated that in most of the large portables tested by CR, the working life will be approximately 250 to 300 hours, or 4 to 5 months if used about 2 hours a day. Since most owners of portables will use their sets mainly in the summertime, one set of batteries should suffice, under the most favorable conditions, for the vacation season. The average cost of a set of dry batteries ("A" and "B" batteries complete) for the sets in the test amounted to about $3.75, when purchased at regular list prices. Considerable savings can be effected by purchasing standard brands of batteries from one of the cut-rate radio supply houses, or by sending an order to one of the large general mail-order houses, both of which guarantee their batteries for a stated "length of service." In the case of Sears-Roebuck, this "service" is "computed on basis of using battery at least 4 hours daily." In other words, the consumer who uses such a battery an average of only 2 hours daily will find the guarantee, in his case, to cover only half the advertised number of hours. Montgomery Ward, on the other hand, gives a guarantee which seems much more satisfactory from the consumer's standpoint since it accepts his record of the time the battery is used, and, in making the adjustment, he is charged only for the time the radio has been playing.

### Battery Care

With care to turn the set off promptly and by other expedients, the user can extend the battery life somewhat. Obviously, forgetting to turn off the set, or allowing it to run needlessly, will soon exhaust the batteries. One of the batteries' greatest enemies is heat. Many of the portable sets become excessively warm when operated on house current, due to inadequate ventilation. It would, therefore, be wise to remove the batteries before entering upon any extended period of operation of the set from the house current. (In some cases batteries must remain connected for power-line operation, in which case deterioration of the battery is likely to be especially rapid.) Allowing the set to stand in the hot sun, or locked up in a closed car during hot weather, will also shorten battery life. When a new set of batteries is needed, always have the battery voltage measured by a reliable concern (preferably while the set is playing) before purchasing new bat-

**Top row, left to right: RCA Victor "Pick-Me-Up" 25BP, Zenith 6G601M, Pilot T-186, Philco 42-842, General Electric LB-530.**
**Bottom row, left to right: General Electric LB-603, Fada C33, Motorola "Playboy" A-1, Admiral Bantam 29-G5, Philco PT-87, Emerson 432, Tom Thumb P-1, Automatic P-60, Emerson 427.**

tery units. Then it may be found that only the "A" or the "B" battery will need replacement, and not both units. (It will, of course, do no harm to the set to replace one unit without replacing the other.) Sets which are equipped with special batteries or battery "packs" can usually, unless space limitations prohibit, be converted to the use of standard batteries by the use of adapters, or by having a serviceman make the necessary changes in plugs. The use of standard batteries will not only make replacement batteries easier to obtain, but may often cut the cost of operation.

### Electrical Shock Hazard

All of the sets in CR's test which were capable of ac-dc operation had, when operated from the a-c power lines, leakage currents (the current which can flow from the chassis or other exposed parts of the set to moist earth, a water pipe or similar grounded object) in excess of that which recognized authorities consider to be desirable. In some cases sets were so poor in electrical safety as to be very dangerous. Users of "3-way" portables should be exceedingly careful in handling any such set when it is connected to the power line. Never manipulate anything inside one of these sets without first completely isolating the set from the power line **by pulling the plug.** In some cases exposed screws or inadequate covers would allow one to receive a possibly serious shock even in the ordinary use of the set. For these reasons CR considers that most of the "3-way" portables in the present test would warrant a *C* rating if purchased for regular use on electric power lines.

### Shortage of Materials and Its Possible Effects on Sets

It has been predicted that the use of zinc in defense industries may cause either a shortage of dry batteries or a sharp increase in battery prices within the next year or so. It is, of course, impossible to say with certainty what the future situation will be, but it does seem very probable that prices will increase substantially. The shortage of materials is likely to cause a number of changes in set design in the near future, some of which may possibly affect the performance of sets rated herein by CR. Permanent magnets for the dynamic speakers may become so difficult to obtain that the use of "magnetic" speakers will increase. One set tested by CR was equipped with the so-called magnetic-type speaker. This type is generally inferior to the dynamic speaker, but its use in portable sets may not be so detrimental since the reproduction of such sets is expected to be poor at best. Other substitutions, such as the use of plastics in place of metal for chassis, dials, etc., may have only minor effects on the sets' utility.

### Portables as Auto-Radio Substitutes

Although portables have been extensively advertised for use in automobiles, airplanes, ships, etc., it is CR's opinion, confirmed by observations in the present test, that most portable sets are of little use as auto radios. Even the best of these sets is a poor substitute indeed for a good car radio. The main difficulties are that ignition noises are likely to cause interference with the reception, pickup of the de-

sired signal is likely to be poor inside the metal car body, and the sets, necessarily heavily limited in sound output, cannot produce enough volume to override the noise of a rapidly moving car. Antennas which can be removed from the case and fastened to the car window may be of some assistance, but before buying any portable set for regular or frequent use in an automobile, be sure to test it out under road conditions and give it a thorough trial.

### Considerations Used in Rating Portable Sets

In rating the sets, sensitivity, or the ability of the set to bring in weak signals, was considered of major importance. The sensitivity of some of the larger portables tested would compare favorably with many of the standard a-c operated receivers; the miniature sets were all much poorer. Sensitivity in a portable is considered of prime importance since the set may often be used in out-of-the-way places where reception is poor, and for true portable operation it is not possible to augment the restricted pickup of the set's loop antenna with a conventional aerial.

Quality of reproduction was also given weight. The tone quality of some of the better large portables would compare fairly well with the conventional small table models, suffering most in comparison by lack of audio power output (power limited in order to conserve battery consumption). Quality of reproduction of the miniature sets was considerably less satisfactory than that of the larger portable sets.

Lack of selectivity will not usually give trouble in the portable sets unless the set is used near powerful stations (or possibly when used at night with an external antenna). All of the sets tested were considered to be satisfactorily selective for most locations, especially for daytime use. Aside from lack of selectivity, superheterodynes are sometimes troubled with code interference, whistles which vary in pitch as the set is tuned, etc. The sets tested were comparatively free from such faults. Any prospective buyer should look for these difficulties, preferably by listening to the set at night in a location where reception is in general good (in the country, not far from broadcasting stations, for example).

Among other features which were taken into account in rating the sets were quality of parts, quality of construction, probable ease of servicing, construction of case, etc. Possibly because of lack of space and because of the need for conserving weight, construction was, in general, rather flimsy, indicative of no great ruggedness or length of life.

In the following listings all sets were of the superheterodyne type, had built-in antennas, and, except as noted, were intended for reception on the standard broadcast band only. Weights of sets given include weight of batteries. All prices given are list prices, and the prices of sets include batteries. Ratings are cr41.

### Portable Receivers, Regular Size

#### A. Recommended

*Emerson*, Model 427 (Emerson Radio & Phonograph Corp., N.Y.C.) $24.95. Set of replacement batteries, $3.90. 6 tubes including rectifier tube. Size of case, about 10½ x 12¾ x 5 inches. Weight (complete with batteries), 14¾ lb. Had desirable r.f. amplifier stage. Sensitivity good, selectivity satisfactory, tone quality fairly good as portable sets go. Quality of workmanship and construction of case, good; quality of parts, average. For its type, considered relatively easy to service. When used on 110-volt lines, electrical leakage current (corresponding to shock hazard) was so excessive that for such use set could receive only a *C* rating. **2**

*Philco*, Model 42-842 (Philco Radio & Television Corp., Philadelphia) $32.50. *Philco* replacement batteries, $4.50. 6 tubes plus usual rectifier tube. Size of case, about 10½ x 13½ x 6¼ inches. Weight, 16½ lb. Sensitivity good, selectivity satisfactory, tone quality relatively good for a portable set. Quality of workmanship and construction of case, good; quality of parts, average. Considered relatively easy to service. When used on 110-volt house current, electrical leakage current (corresponding to shock hazard) was considerable. **3**

*Zenith*, Model 6G601M (Zenith Radio Corp., Chicago) $34.95. *Zenith* replacement battery pack, $4.50. 5 tubes plus rectifier tube. Size of case, about 9¾ x 15 x 6¾ inches. Weight, 18 lb. Sensitivity excellent, selectivity satisfactory, tone quality relatively good. Quality of parts, quality of workmanship and construction of case, good. Considered relatively easy to service. Was equipped with removable loop antenna which could be fastened to window for reception under difficult conditions, as in car, train, steel building, etc. This set was the only model tested which CR considers could act as a passable substitute for an auto radio. When used on house current, leakage current was considerable but somewhat better than *Philco* receivers in test. **3**

#### B. Intermediate

*Philco*, Model PT-87 (Philco Radio & Television Corp.) $19.95. *Philco* replacement battery pack, $3.25. 4 tubes plus rectifier tube. Size of case, about 9½ x 11 x 5 inches. Weight, 10½ lb. Sensitivity fairly good, selectivity satisfactory, tone quality fairly good. Quality of parts, average; construction of case, fairly good; quality of workmanship, good. Had magnetic instead of the more desirable dynamic speaker. Servicing considered relatively easy. When used on house current, leakage current was considerable. **1**

*RCA Victor* "Pick-Me-Up," Model 25BP (RCA Mfg. Co., Inc., Camden, N.J.) $26.50. Set of replacement batteries, $3.75. 4 tubes plus rectifier tube. Size of case,

about 9 x 12 x 6½ inches. Weight, 13¾ lb. Sensitivity fairly good, selectivity satisfactory, tone quality good but not quite equal to *Philco*, Model 42-842. Quality of parts, somewhat better than average; quality of workmanship, good; construction of case, good. Considered relatively easy to service. When operated on house current, leakage current was so excessive that for such use set would receive only a *C* rating. **2**

*General Electric*, Model LB-530 (General Electric Co., Bridgeport, Conn.) $39.95. Self-recharging type using storage battery with charging accessories contained in the cabinet. Price of battery (which should not need replacement for several years), $6.50. 5 tubes. Size of case, 12¼ x 13 x 5 inches. Weight, 16½ lb. Sensitivity fairly good, selectivity satisfactory. Tone quality was relatively good, but was spoiled by excessive case vibration and hum from vibrator used to obtain necessary "B" voltages from storage battery. Hum and vibration especially noticeable and disturbing when set was placed on light table or other non-massive support. Difficulty could probably be economically eliminated by intelligent design changes by maker, with proper mounting of vibrator. Prospective purchasers should give set thorough trial before buying since there will be some variation in amount of vibration, and some samples might be less objectionable in this respect. Quality of parts, about average; dial, somewhat flimsy. Workmanship, generally good, with certain exceptions noted. Construction of case, good. Considered to be moderately difficult to service. Maker's claim of 15 hours' operation on battery before recharging being required, considered conservative. Set would not perform satisfactorily in car, even with the external window antenna in use. When operated from a-c house current (set not adapted for use on d-c lines), electrical leakage current was by far the least of all sets usable in this way, but the set did fail by a small amount to meet recognized requirements. In view of a possible future shortage of or much higher prices for dry batteries, and considering the complete rechargeability and its long battery life if properly cared for, this set might warrant an *A* rating for many consumers. **3**

*Pilot*, Model T-186 (Pilot Radio Corp., Long Island City, N.Y.) $44.95. Set of replacement batteries, $3.90. 5 tubes plus rectifier tube. Was equipped for reception on both standard broadcast and short wave (5.63 to 16.56 megacycles) bands. Size of case, 11 x 13¼ x 6¾ inches. Weight, 17¾ lb. Set had desirable r.f. amplifier stage, but sensitivity only fair—reception poor on short waves even with an external antenna and ground. Selectivity satisfactory, tone quality relatively good. Construction of case, quality of parts, and quality of workmanship, all good. Considered relatively easy to service. When operated from house current, leakage current was so excessive that for such use set could receive only a *C* rating. **3**

### C. Not Recommended

*Automatic*, Model P-60 (Automatic Radio Mfg. Co.; Inc., Boston) $24.95. Set of replacement batteries, $3.40. 3 tubes plus usual rectifier tube. Size of case, 8¾ x 12¼ x 6 inches. Weight, 11 lb. Sensitivity, poorest of large portables tested—on a par with the more sensitive of the miniatures. Selectivity satisfactory, tone quality fairly good. Construction of case, fairly good, but not well finished. Quality of parts, average, but "A" battery containers flimsy and not likely to stand up in service. Workmanship and probable ease of servicing, fair. Had lowest battery drain of large portables in test, and was equipped for "recharging" dry batteries (see text for comments on this feature). When operated on house current, leakage current of this set was excessive. **2**

## Portable Receivers, Miniature Type

### B. Intermediate

*General Electric*, Model LB-603 (General Electric Co.) $26.50. Cost of replacement batteries, $2.80 ("A" battery consisted of 3 standard flashlight cells). 5 tubes plus rectifier tube. Size of case, 6½ x 9½ x 4½ inches. Weight, 6 lb 4 oz. Sensitivity, next to best of miniature sets tested, but considerably less than that of most of the large portables. Selectivity, satisfactory. Tone quality, about average for small set of miniature type. Construction of case, good, but it is considered likely that snap fastening for covers may not prove durable. Quality of parts average, of workmanship good. Servicing considered relatively easy, for miniature set. Battery drain, somewhat higher than of most other miniature sets in test. Set was of "3-way" type. When used on house current, leakage current was so excessive that for such use set would warrant a *C* rating. **2**

*Tom Thumb*, Model P-1 (Automatic Radio Mfg. Co.) $24.95. Cost of replacement batteries, $2.70 ("A" battery consisted of 2 standard flashlight cells). 3 tubes plus rectifier tube. Size of case, 9 x 4¾ x 4½ inches. Weight, 5 lb 2 oz. Sensitivity not quite so good, tone quality about same, as *General Electric*, Model LB-603. Selectivity, satisfactory. Construction of case, good. Quality of parts average, but workmanship only fair, and servicing considered likely to be rather difficult. Battery drain, lowest of miniature sets. Set was of "3-way" type with provision for "recharging" dry batteries a number of times (see text for discussion of this feature). When operated from house current, leakage current of this set was so excessive that for such use set would warrant a *C* rating. **2**

### C. Not Recommended

*Emerson* "Power-Mite," Model 432 (Emerson Radio & Phonograph Corp.) $19.95. Cost of replacement batteries, $2.60 ("A" battery consisted of 1 flashlight cell). 4 tubes; was intended for battery operation only. Size of case, 8½ x 4¼ x 2 inches. Weight, 3 lb 6 oz. Sensitivity and tone quality, about the same as *Tom Thumb*. Selectivity, satisfactory. Set had plastic case of thin, weak construction, easily deformed—door of set was sprung by the on-off switch. Quality of parts average, of workmanship fair. Set tested was defective in that it would not operate until "works" were removed from the case to give clearance for certain crowded parts. Servicing, considered rather difficult. **1**

*Fada*, Model C33 (Fada Radio & Electric Co., Long Island City, N.Y.) $19.95. Cost of replacement batteries, $2.80 ("A" battery consisted of 3 standard flashlight cells). 4 tubes; was intended for battery operation only. Size of case, 4¾ x 8 x 4¼ inches. Weight, 5 lb 4 oz. Sensitivity, poorest, by considerable margin, of sets tested. Selectivity, satisfactory. Tone quality, about the same as *General Electric*, Model LB-603. Construction of case good, quality of parts average, quality of workmanship good. Servicing, considered rather diffi-

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# Heating Systems

## Selecting the Right System of Heating for Your Home

AMONG the earliest but now less familiar devices for heating a home was the kitchen or parlor stove. Such a stove heats by radiation and convection. In heating by radiation it throws heat directly, and without any necessary motion of the air, to the floor, the ceiling, or anyone "within sight" of the stove. The amount of radiant heat transmitted to an object within sight of the stove (or, if you prefer, within sight of a steam or hot-water radiator) depends approximately upon (1) the area of the intercepting body (a body twice as big receives twice as much heat); (2) the nearness to the stove (or radiator), being, when the stove is small, four times as great when the intercepting body is at half the distance; (3) the temperature difference between the hot stove and the intercepting body, being somewhat more than twice as great when the temperature difference is doubled. An object out of sight of the stove, that is, in the next room, does not receive this radiant heat. Hence, as a rule, it is necessary, in order to obtain heat transmission of this type, to have a "hot body" in the form of a stove, radiator, or the glowing coals in a fireplace in each room that is to be heated.

By the convection method of heating, there is an actual material flow of heated air which is warmed by the stove, expands, and becomes lighter and rises while cooler air moving along the floor takes its place. This circulating movement of air is known as convection, and through its action, it becomes possible to convey warm air to places remote from the hot stove or radiator. The walls and floor of a room heated chiefly or in part by radiation are likely to be warmer than those heated entirely by convection, and this is one advantage of steam and, to a lesser degree, of hot-water heating.

The various systems of heating homes in use today make use of one or both methods of heat transmission. Steam, vapor, and hot-water radiators and stoves heat by radiation and convection; the hotter the radiator, the greater the proportion of heat which is delivered as radiant heat in contrast to air-borne heat. With warm-air systems or furnaces, the heating of the rooms above the basement is entirely by convection.

### Steam

The chief advantages of heating by steam are:

1—Heat is rapidly obtained when needed.
2—Radiators used are relatively small.
3—Installation is simple and inexpensive if the one-pipe system is used.

The disadvantages of heating by steam are:

1—Uniform heating is obtained only when the system is carefully designed and installed and when steam pressure is maintained. In mild weather, uniform heating will usually imply **over**-heating.
2—System gives odors due to the high temperature of the radiator surface and the effect on hot dust particles in contact therewith, and to gases and vapors escaping from the air valves.
3—Air valves on radiators often give trouble or require replacement.
4—There may be considerable noise of thumping and hammering unless installation is carefully done or the more expensive two-pipe system is used.

In winter, when a sudden fall of temperature occurs or when the temperature of the house has to be brought up quickly from a cold start, steam or vapor heating will provide heat faster than any other system, except possibly a warm-air system using a power (motor-driven) blower. But, on the other hand, when the steam leaves the radiators, they cool off rapidly. Consequently room temperatures fluctuate considerably in homes heated by steam. For many purposes, this is not objectionable, and probably consumers give far too much weight to uniformity of temperature. It seems rather certain that a moderately fluctuating rather than a steady temperature is good for the health; that is, the heat-regulating mechanism of the body, like other bodily functions, needs exercise.

With the disadvantage of high temperatures on the surface of steam radiators, there goes an advantage which is rather important from an economy standpoint, that is, radiators need only be about two-thirds as large as lower-temperature hot-water radiators. When a one-pipe steam system is used, the small radiators combined with the simple piping make this type of heating system one of the least expensive to install.

A certain amount of noise in one-pipe steam-heating systems is likely, due to the presence of

water and steam in the same lines. Air escaping from the valves produces a small amount of noise. There may also be noise caused by the alternate expansion and contraction of the steam pipes as they are heated and cooled.

### Hot Water

The chief advantages of heating by hot water are:

1—Heating is uniform and also steady (due to the thermal inertia or heat storage capacity of the very considerable quantity of water, a substance of very high specific heat, in the system).
2—System is easy to control.
3—There is little or no noise, and the problem of venting the air from the radiators is simplified.
4—The temperatures of the radiators themselves are relatively low, giving somewhat less odor of heated dust.
5—System is economical in operation, simple in construction, and dependable.
6—System may be used in houses having no cellars.

The disadvantages of hot-water heat are:

1—It is slow in responding to changed heating requirements.
2—On account of the size and number of pipes required and the larger radiators, it is expensive to install.
3—Adaptation to heating water for domestic use is somewhat more complicated than for steam or vapor.

Since the temperature of the water in the radiators may be at any value from room temperature to the boiling point, it is possible to vary the rate of heating over a wide range. This makes some types of hot-water systems advantageous on mild days when only a little heat is required, for a few hours.

Many present-day hot-water heating systems, and practically all of the older ones, depend upon gravity circulation due to the decreased density (specific gravity) of the heated water as compared with the cold water returning from radiators. Motor-driven pumps or circulators that force the water through the radiators are also being used, particularly in large installations. They speed up the response to calls for heat by the thermostat or other regulator, they make possible the use of smaller radiators in some installations and permit the heat to be more certainly distributed to remote rooms, and they allow the use of smaller pipes between boiler and radiators. On the other hand, the motor and pump add to the cost of the installation and also to the operating costs of the heating plant of a small home. In the East, Midwest, or Northwest, the additional amount will come to about $8 per year for electric power (at 5 cents per kilowatt-hour). Then, too, there is greater possibility of failure of the system due to interruption of the power supply during a storm or to mechanical failure of the pump. With some systems, such interruption may result in the whole heating system's being rendered practically useless. Anyone installing a system requiring continuous or intermittent operation of a motor for its successful functioning, must give serious thought to the possibility or probability of power-system failure for long periods in his territory, and it is to be remembered that this is more, rather than less, likely to occur in severe cold weather.

### Vapor

The advantages of heating by vapor are in part the same as heating by hot water:

1—Heating is uniform and easy to control.
2—There is no noise, and trouble with vents is unlikely.
3—Radiator temperatures are relatively low.
4—System is economical in operation, simple, and dependable.
5—Radiators are smaller than for hot water.

The disadvantage of heating by vapor is:

1—Installation is relatively expensive.

The vapor-heating system resembles a two-pipe steam system, but it is sealed against admission of air and provides circulation of steam at lower temperatures than 212°F.

### Warm Air

The advantages of heating by warm air are:

1—Heat is rapidly obtained when needed.
2—For small homes, the system is least expensive to install.
3—Room space is not taken up by radiators.

The disadvantages of warm-air heating are:

1—System is not as readily adaptable as other systems to heating water for domestic use, either in summer or winter.
2—Considerable space is required in the cellar and walls for ducts. In some cases, the necessary head room below the cellar ceiling may be difficult to provide.

A gravity warm-air system has certain limitations, especially when installed in a house of rambling construction. Circulation by gravity is provided by the rising of the air heated by the furnace and the flow of cold air to the bottom of the furnace to take its place. For the best performance, return of the cold air should be provided for by return ducts running from each major space in the house. If the expense of these must be saved, then a gravity warm-air system should be installed only in a house of relatively open interior construction. If too much reliance is placed upon narrow hallways, etc., for transmission of cold air back to the furnace, a very unpleasant drafty condition

may develop in extreme weather. The openings into the cold-air ducts should preferably be located near the cold walls.

While humidification is easily achieved with warm-air heating systems, it is important to note that humidification in most cases will have more disadvantages than advantages, and when adequate in amount to be of practical importance, can cause serious condensation on windows and in walls, with resultant deterioration of woodwork, insulation, etc.[1] In any case, addition of humidity to the air in a house, artificially, is very likely to call for special precautions against damage to the house, such as discussed in the references mentioned in the footnote.

Some warm-air heating systems use a motor-driven blower to produce circulation. With these, smaller ducts are used. Forced-air circulation has the advantages that the furnace can be placed at any convenient spot; rooms with excessive heat loss (as corner rooms or rooms with unusually large window exposure), also rooms which, for other reasons, are difficult to provide with sufficient warm-air flow, can be more adequately heated; the air can be filtered. But with these smaller ducts goes the disadvantage of higher air velocity, as a result of which complaints are sometimes heard of too sudden changes in temperature when the thermostat turns on or shuts off the heat. The electric power cost for a motor-driven blower in a six-room house in the East, Midwest, or Northwest is considerable—$15 to $25 per season (at 5 cents per kilowatt-hour). Other disadvantages are the greater noise of the forced-circulation system and the addition of an essential motor-driven unit, bringing the likelihood of failure of heat supply due to interruption of electric current during a storm or to mechanical failure of the blower unit itself.

Winter air conditioning is the term given to forced warm-air heating when filters and humidifiers are used. Large quantities of moisture should not be added to the air in wintertime unless the walls of the house contain a vapor barrier. Otherwise, water will condense in cold walls and rot woodwork or spoil wallpaper, as already noted and as more fully explained in the May 1938 **Bulletin** previously cited. Filtering of the air, however, has its advantages and may help to keep house furnishings, curtains, and the like clean. Any claims of great advantages to health should probably in most cases be regarded as exaggerations.

Installation of warm-air heating systems should be made in accordance with **The Standard Gravity Code for the Design and Installation of Gravity Warm Air Heating Systems** (25 cents) or **The Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems** (50 cents); both are obtainable from the National Warm Air Heating and Air Conditioning Association, 50 W. Broad, Columbus, Ohio.

## Fuel and Heating Equipment

### Coal and Coal-Burning Equipment

Whether to use bituminous (soft) or anthracite (hard) coal is generally determined for the average person by the locality in which he lives. The anthracite-burning region is confined principally to the Middle Atlantic and New England States. Hard coal burns with practically no smoke, whereas soft coal is inclined to be smoky, and often gives difficulty with clinkering. Burning soft coal requires more attention and care by the householder. Also, the combustion space of the boiler or furnace burning soft coal must be large so that fairly complete combustion and minimum smoke will be obtained. For the relative costs of coal burning, see CR **Bulletin**, October 1939, page 10.

Though some find it burdensome to care for a furnace, hand-firing is still the most reliable method of obtaining heat, being unaffected by current interruptions due to storms and by the unpredictable stoppages of various sorts that can occur at times with any automatic heating equipment. Some of the advantages of automatic equipment are obtainable with hand-fired furnaces.

Mazagine-feed boilers especially lighten the householder's burden by lessening the frequency of firing and permitting the burning of the smaller sizes of anthracite coal which are cheaper than the larger sizes. Such boilers are efficient in their use of fuel after one acquires a little familiarity with the handling of the fuel bed and shaking of the ashes. Because of the height of the coal door, it is a little more difficult with magazine-feed boilers to fill the magazine with coal than to shovel coal into the

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[1] Two important discussions of the disadvantages and dangers of adding moisture to the air of the home ("To Humidify or Not to Humidify" and "Thermal Insulation for the House") are contained in CR *Bulletin*, May 1938. These two articles, together with other important references on Home Building and Upkeep Supplies, are also available in the form of a bound set of tear sheets (11 articles in all) at 50c (see CR *Annual Cumulative Bulletin*, Sept. 1941, col. 254). The May 1938 *Bulletin* and the set of tear sheets are available only to subscribers to CR's confidential service.

# Toilet Soaps

THERE ARE many soap manufacturers who have been quite careless in making claims which later they were unable to substantiate. Fortunately, the Federal Trade Commission, as a consequence of the Wheeler-Lea Act, has been able lately to do something about extravagant and misleading advertising, even in cases where the element of unfair competition was not present (as it was required to be formerly for the F.T.C. to have jurisdiction).

Some of the manufacturers, including Yardley of London, have labeled soap "English Lilac," "English Orchid," "English Lavender," etc., when the soap was made, not in England, but in Hoboken, or some other American city, and have given the impression, by not revealing where the soaps were manufactured, that they were really imported.

One imaginative manufacturer called his soap "Air Conditioning Soap" and claimed, seriously, that it air-conditioned the human body, reducing both its temperature and humidity. Others have printed fictitious prices on boxes of soap, so that the actual price, which was much lower, would make the soap seem like a great bargain to the purchaser. (For example, the price printed on a box of soap manufactured by the United Soap Co. of Seattle, Washington, was 75 cents, though it was sold for about 5 cents to peddlers and canvassers who resold it from house to house. Such misleadingly priced soap was sold under a variety of brand names, e.g., *Velvette*, *Marvola Creme*, *Creme Boquet*.)

Several manufacturers, at the instance of the F.T.C., have lately had to desist from representing that the oil content of their soaps was wholly olive oil, when such was not the case. Among these was the Colgate-Palmolive-Peet Co., which has exaggerated olive oil content, the type of olive oil used, and the importance of olive oil content as used in their soap. This company was further restrained from misrepresenting that the "soft, smooth complexions" of the Dionne quintuplets were directly the result of *Palmolive*, or that use of this soap would keep the skin young, thoroughly cleanse the pores, or assist in any way toward nourishment of the skin.

Advertising of soaps, as a result of the new power invested in the F.T.C., has been undergoing changes during the past two or three years. The admen have had to develop new techniques, for direct misstatements have become more and more risky and increasingly likely to raise difficulties with those whose duties it is to restrain the adjectival proclivities of the literary geniuses in the advertising agencies.


**Illustrating how the soap manufacturer advertiser can adapt his copy to the new restrictions on misleading advertising. The claim for the "Facial Cocktail" and the "Come-Hither" quality — obviously fantastic—which might lead to trouble with the Federal Trade Commission if the claim were made by the advertiser himself, is evidently thought to be safe when made by one of the soap's glamour-girl consumers.**

Not Confidential—Consumers' Research, Inc.

Soap manufacturers and their agencies have been able to substitute suggestion for misrepresentation. For the bald misstatements of fact which they formerly used, admen, always handy with a new verbal technique where required by changing circumstances, have developed a new art of conveying false impressions by means of studied, shrewd groupings of statements, no one of which is false. Debutantes, Hollywood stars, and even nonentities are relied upon to make statements for which the admen themselves find it inexpedient to take responsibility.

*Cashmere Bouquet* is no longer claimed to cause the skin to become alluring, clear, or smooth in cases where such results will not be achieved by cleansing the skin. Nowadays an ad does not state that use of So-and-So's soap will bring "Beaux a'Plenty" nor that it will produce skin which looks like "peaches and cream"; but a *Cashmere Bouquet* ad says, "Beaux a'Plenty when skin looks like 'peaches and cream.' " The reader herself is left to connect this more or less obvious idea with use of *Cashmere Bouquet*, and no doubt the reader in thousands or millions of cases, impelled by her own wish to be more attractive and alluring, furnishes the wanted connection.

The manufacturer of *Woodbury Facial*, likewise, doesn't claim today that this soap contains "Come-Hither"; it is "Miss Joan Martin, one of New York's loveliest debutantes" who comes forward to make the claim that this soap contains "Come-Hither" and brings a " 'lovely-lady' look" and encourages men's attentions. Miss Martin's scientific qualifications are nowhere apparent, yet she does not hesitate to make for others the choice of soap which, to be made competently, **must be based upon technical considerations**—the very considerations indeed which form the basis for CR's ratings of soaps, which follow. It need hardly be said that Miss Martin's ignorance of such questions as percentage of unsaponified saponifiable matter, free alkali present expressed as NaOH, must be great, if she is not a graduate chemist or chemical engineer. Only technically qualified persons are justified in making large-scale recommendations of soap for others to buy, and Miss Martin's testimonial gives no sign of any background of technical training—if she has it.

At present, the two largest makers of soap in the United States are waging war against each other—one of the greatest merchandising wars of the century. By radio, magazine, and newspaper advertising, by coupon offers, and by lawsuits over patent infringements, these two companies are battling to determine whether *Ivory* or whether *Swan* shall be first in the great American bathtub. The consumer can sit back and view this war with equanimity, taking advantage of whatever price concessions may be offered him from time to time, for both soaps, on the basis of CR's chemical analyses, are good soaps. Neither is remarkable in any sense that would call for the tremendous advertising expenditure which is being lavished upon the two products.

Soaps are made by the chemical reaction of a fatty acid with soda or potash lye, a process once carried out in the home, using fats saved in cooking and lye leached from the wood ashes from the kitchen stove. Perfume is commonly added to the products of the reaction between the lye and the fat (or oil), when the soap is used for toilet uses. To make a floating soap, air is beaten into the liquid soap to make it lighter before it solidifies. Some soap is made transparent by adding glycerin, sugar, castor oil, or possibly some other ingredient.

Various useless additions are also made to some soaps in order to permit special advertising claims; for example, carbolic or cresylic acid, casein, or vitamin A, D, E, or even the mythical vitamin "F," may be added for the sake of providing some sort of plausible basis for advertising a health soap, milk soap, or a beauty soap. Such ingredients do not add to the value of soap from the standpoint of the consumer, but for people who have had no training in scientific modes of thought, they have added tremendously to advertising appeal and have caused many millions of dollars of needless consumer expenditure.

The type of oil or fat providing the fatty acids that enter into the chemistry of soap manufacture has an important bearing on the resulting product. In pure Castile soap, olive oil is the sole source of fatty acids, and such a soap is notably mild in its effect on the skin. Coconut oil is extensively used in making floating soaps and, in lesser amounts, in making other soaps. Use of more than 20% of coconut oil is likely to produce a soap that is irritating to the skin of many users. (Liquid soaps used in public washrooms and bottled shampoo soaps are usually very high in coconut oil, hence are hard on the skin or scalp.)

The soap user—and that means most every-

body—should remember that the soap maker must make a compromise between good lathering qualities and minimum harmful or irritating effect on the skin. If good foam and lather-producing effects are uncritically demanded by the user, the soap maker will furnish it, but the soap which he provides will have a more severe effect on the skin than the soap which calls for more rubbing and a little longer time in washing.

In many families, a great deal of soap is wasted by the cakes' being laid down in water; for economical use of soap, it should be left to dry in dishes of open construction so that the water quickly drains away. Some soaps when bought contain much more moisture than others, and if such "wet" soaps are used at once, much soap will be wasted; if the cakes do not feel definitely dry, store them in a dry place for some days or weeks before using.

When the water is hard, consumption of soap can be cut as much as one-half by softening the water chemically. For washing dishes or clothes or for shampooing, tetrasodium pyrophosphate (about one teaspoonful per gallon of water) is one of the best and most economical water softeners now available to consumers.[1]

CR's tests of soaps were made to determine their compliance with Federal Specifications for milled toilet soaps or for floating soaps, whichever were applicable. The amount of coconut oil present was also determined. Prices quoted are the actual prices paid in retail stores or by mail in the East and on the West Coast when the samples were purchased for test.

To enable the consumer to buy soap economically, the actual amount of dried (moisture free) soap in each cake was determined by laboratory tests and the price per pound of dried soap was computed for the different brands and is given in bold face type. Price ratings, **1, 2, 3,** are assigned on the basis of these tests.

From the consumer's standpoint, there is no objection to the presence of water except as already noted (providing that the soap is well dried out before it goes into use), but he must know what the water content is (or must know the price per pound of dry soap) in order to make effective price comparisons between one brand and another. Price per pound of dry soap, which largely is a measure of relative economy in use, varied from 15 cents to $1.22 per pound for the different brands. Soaps which had either comparatively low coconut oil content or no coconut oil content are indicated by an asterisk (*) for the benefit of individuals who wish to buy the soap with the least possible irritating properties.

Ratings are cr41.

### A. Recommended

*Colgate's* Floating (Colgate-Palmolive-Peet Co., Jersey City, N.J.) 5c a cake; **17c.** **1**

*Gondola* White Floating (Distrib. Woolworth stores) 5c a cake; **15c.** **1**

*Ivory* (Procter & Gamble, Cincinnati) Guest size, 4-1/6c a cake; **19c.** Medium size, 4-2/3c a cake; **17c.** Large size, 8-1/3c a cake; **18c.** **Note:** When purchased at the price stated, the large size was more expensive than the medium size. **1**

*Jergens* (The Andrew Jergens Co., Cincinnati) 4c a cake; **20c.** **1**

*Kirkman* Pure White Floating (Kirkman & Son Div., Colgate-Palmolive-Peet Co., Brooklyn, N.Y.) 4¾c a cake; **19c.** **1**

*La Dore* Hard Water Cold Cream, Sears-Roebuck's No. 8—4984. 45c plus postage for 12 cakes; **22c** (computed to include postage within 150 miles).* **1**

*Lifebuoy Health* (Lever Bros. Co., Cambridge, Mass.) 5-2/3c a cake; **25c.** Notwithstanding the designation "Health Soap" by the manufacturer, this soap does not contain any particularly healthful ingredients. The undesirable "exclusive ingredient" phenol or cresol, giving a carbolic-acid-like odor, may be irritating to some skins. **1**

*Mission Bell* (White King Soap Co., Los Angeles) 4½c a cake; **21c.** **1**

*Swan* (Lever Bros. Co.) Regular size, 4-2/3c a cake; **16c.** Large size, 8-1/3c a cake; **17c.** Coconut oil content, somewhat high. **Note:** Large size was more expensive than regular size. **1**

*White King* (White King Soap Co.) 4-2/3c a cake; **22c.** **1**

*Cashmere Bouquet* (Colgate-Palmolive-Peet Co.) 8-1/3c a cake; **40c.*** **2**

*J.C.Penney* Cold Cream Hardwater (J. C. Penney Co. stores) 6¼c a cake; **31c.** **2**

*Palmolive* (Colgate-Palmolive-Peet Co.) 5-2/3c a cake; **28c.** Coconut oil content, somewhat high. **2**

*Sweetheart skin charm* (Manhattan Soap Co., N.Y.C.) 5-2/3c a cake; **31c.** **2**

*Woodbury Facial* (John H. Woodbury, Inc., Cincinnati) 7-2/3c a cake; **36c.*** **2**

*Cuticura* (Potter Drug & Chemical Corp., Malden, Mass.) 25c a cake; **$1.22.** One of 2 soaps tested in which no coconut oil content was reported by the chemist.* **3**

*Pears's* Original Transparent (A. & F. Pears, Ltd., London, England) 15c a cake; **85c.** One of 2 soaps tested in which no coconut oil content was reported.* **3**

### B. Intermediate

*Blue Label* Floating, Cat. No. X5722 (Cooperative Distributors, N.Y.C.) 39c plus postage for 5 cakes; **24c** (computed to include postage within 150 miles). Somewhat exceeded Federal Specifications' limit for amount of matter insoluble in water. **1**

*Nemo* Hardwater, Cat. No. X5711 (Cooperative Distrib-

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[1] Sources of supply are: New Dorp Chemical Co., New Dorp, Staten Island, N. Y., $1.25 for 10-lb bag postpaid within 150 miles of N. Y. C.; Ralph H. Luebbers, 7 Sunset Lane, Columbia, Mo., 50c plus postage for 5-lb bag.

# Gasoline, Oil, and Tires

## HOW TO MAKE THEM GO FARTHER

**During the past few months, American consumers have been the target of much publicity and advice from all sides, including government agencies, tire companies, newspaper "experts," and others, regarding the economical operation and maintenance of their automobiles, all to the end of helping to conserve materials needed for national defense and carrying out of the Lend-Lease Program. The recommendations have, for the most part, been well directed, but it is curious and unfortunate that the government particularly should have waited for a national emergency in order to make generally available to the people information of value which government agencies have had in their possession and have made their own use of for many years. Much of the new information about economical operation of automobiles has been old information to CR subscribers, having appeared in our recurrent reports on automobiles, tires, gasolines and oils, etc. Because of its present timeliness, we have assembled this information, brought it up to date, and present it herewith for the guidance of our readers, new and old.**

FOLLOWING the transfer of 50 American tankers to Great Britain, Secretary of the Interior Ickes, in his capacity as Petroleum Coordinator, has predicted a shortage of gasoline in the fall and winter of 1941-42 for the whole Eastern seaboard. Oil men have been quick to plan oil pipe lines as a remedy but have pointed out that this alternative to an oil shortage will be more expensive than shipping oil by tanker. It costs 21 cents a barrel, they say, to ship oil by tanker from Gulf of Mexico points to Eastern refineries against 60 cents to pump it overland. (Oil which is pumped long distances moves very slowly and requires intricate, elaborate, and expensive pumping and auxiliary equipment at frequent intervals.)

### Gadgets and Dopes

When, and if, the gasoline shortage comes, makers of numerous gadgets and "dopes"—gadgets to be applied to the engines and "dopes" to be applied to the gasoline—will have their heyday in selling their so-called fuel savers, for many consumers will easily be led to suppose that by buying a contrivance to be attached to carburetor or intake manifold, a miraculous result in fuel-saving will follow. Reasoning about the question would suggest that if there were solid merit in such devices, motor-car manufacturers, who of late have found reason to seek and talk of economy in gasoline consumption of their engines, would be applying the device themselves—not only that, but making a great sales and advertising feature of it. In point of fact, devices of this general sort are, as a rule, useless or ineffective, and the principles of their operation are based on the manufacturer's or purchaser's ignorance of carburetor and manifold design.

### High Speed and Careless Driving Are Costly

Any attempt to economize on fuel will fall short of its goal unless attention is given to driving speed. Smooth modern highways tempt drivers to speeds of 65, 70, and even more, miles an hour. Such speeds would be less exhilarating to those who indulge in them if the extra outlay for the gasoline, oil, and tires involved were borne in mind. The most economical speed for a passenger car is about 20 to 30 miles an hour, and at speeds beyond 40 mph consumption of gasoline and oil and wear on tires, engine, and chassis increase rapidly.

Far too many consumers take delight in getting the jump on other cars when the traffic lights change. Such rapid acceleration consumes considerable extra gasoline, wastes tires, and needlessly strains engine and chassis parts. In a test a few years ago over a one-mile course, with 10 stops and starts, a test car was slowly accelerated each time to 7 miles an hour in low gear and 14 in second, and gave 16.5 miles to the gallon. On the second test, accelerating rapidly to too high a speed in low and second gears, there was a loss in mileage of 2½ miles per gallon. That gasoline can be wasted by needlessly rapid stopping as well as by overfast accelerating was also brought out in this test. (The power wasted in heating up the brake drums comes from the gasoline which propelled the car just before the brakes are applied.) Driven at a more sensible speed just before stopping was required, the car would be slowed down chiefly by the engine's compression, with a much smaller waste of fuel. Racing the motor is hard on it and wastes gasoline.

Careless or excessive use of the choke, or a choke of the automatic type that is operating incorrectly, is likewise an offense against economy. Excessively long idling of the motor not only uses gasoline needlessly, but fills the air—frequently under somebody's home or office window—with fumes that are neither pleasant nor good for health.

### Important Adjustments and Other Aids

If your new car's motor has been in use for a considerable period of time, it is well to check that it is not idling too fast. There is a tendency for motors to speed up their idling during the breaking-in period.

Gradual changes in carburetors that can cause serious waste of gasoline are common and frequently escape the notice of owners who are not accustomed to checking their mileage reading against gasoline consumed when they buy another tankful. It is sound practice to keep a careful record of your gasoline and oil consumption and mileage, calculating (about every 1000 miles) the miles you are getting per gallon of gasoline and miles per quart of oil. Any lowering of performance will then be quickly noticed and steps can be taken to have the engine adjusted before much gasoline and oil are wasted.

The automobile air cleaner is a very important device, but no part of a car is more likely to be neglected. It should be remembered that the engineers designed the carburetor of your car to supply the proper amount of fuel when equipped with its air cleaner. If the air cleaner is removed, the engine must run on a leaner mixture; if the air cleaner becomes stopped up with dirt, the engine will run on a richer mixture and so waste gasoline. It is a matter of real and practical importance, therefore, that the air cleaner of your car should be cleaned according to the manufacturer's directions at least once every 5000 miles—more frequently if the car is operated in very dusty regions.

Cars which start with difficulty are nearly always wasters of gasoline because they tend to encourage overuse of the choke. A check of the spark plugs and distributor will often reveal the reason for the hard starting of a car. Sometimes hard starting is due to an inherently bad design of the starting motor or an underpowered battery. Both of these faults have been the result of the all-too-common feeling among automobile manufacturers that it is foolish to put into a car material and workmanship of a kind which does not lend itself well to advertising and high-pressure salesmanship, and so does not help make the initial sale.

Two other points that affect fuel economy are the cooling system and the tires. A motor that runs too cool uses more fuel than is needed. Driving on oversoft tires wastes power (as well as rubber) needlessly, in the same way as does driving through loose sand or gravel.

The owner who does not wish to waste gasoline will avoid having his tank filled to the very limit in hot weather, for under such circumstances there is frequently a waste of fuel by sloshing out of the filler pipe, or by bubbling of air or vapor through it in the heat of the sun, or overflowing when the car filled in an inclined position later stands nearly level.

Assuming that all the foregoing suggestions have been carried out, gasoline economy can be further improved in some cars by having the carburetor jets replaced by smaller so-called economy jets. For a person using a car so much or for such long distances daily that the investment will be justified, another change should be considered, that is, having the rear axle replaced by one geared to a lower[1] or "economy" ratio (a gear ratio by which the engine makes fewer revolutions per mile than that normally supplied in cars). These replacements are not available at the present time for all makes of cars, and for those makes for which they are available, prices may be unreasonably high or the dealer may do what he can to discourage the customer from obtaining a new car with the lower ratio (or having a car already bought changed over). However, since the automobile industry is shortly expected to go on a basis where servicing is to be its chief or major source of income, and new car selling is to be relegated to a much smaller place than at present, it may be that dealers will "get next to themselves" and really look for business in installing economy carburetor jets and economy-ratio rear axles, and not try to discourage car owners wishing to save fuel and oil.[2]

### Changing of Crankcase Oil

In order to save oil, follow CR's oft-repeated

[1] Gear ratio is the number of revolutions of the engine crankshaft per revolution of the rear wheel on the road, and runs for different cars between 3.5 and 5.1, approximately. The (total) gear ratio is the same as the rear axle ratio, when the car is running in "high." It will be noted that gear ratios for automobiles run opposite to those for bicycles, in which a high ratio corresponds to fewer turns of the driving crank in relation to revolutions of the rear wheel on the road. (There is a reversal of usage in the case of the automobile itself, the car being said to be in "high [or third] gear" when the engine is rotating at its slowest relative speed.)

[2] The fluid clutch devices now offered on several models of cars are desirable from many points of view, but not from the standpoint of saving gasoline (at least for the person who drives much in the city) for they work by slippage between the engine crankshaft and the car's drive shaft, and at low speeds, slippage may be as much as 12%, which can account for an obvious loss of gasoline mileage.

advice in regard to the changing of crankcase oil; namely, under normal driving conditions, and after the breaking-in period of a new car, change oil only twice a year, i.e., before winter and summer, **being careful to maintain the proper level** between times by replacing the oil being burned up in the cylinders or lost through leakage. (For more information, see CR's **Annual Cumulative Bulletin,** September 1941; for a full statement of the problem see **A Consumer's Study of Automobile Gasolines and Lubricating Oils—SB26** [25 cents].) It is interesting to note that essentially the same advice regarding the changing of oil has been issued by one of the new governmental super agencies, the Office of Price Administration and Civilian Supply (supplanted, just a few weeks back, by another, still newer, super agency). In so far as this advice is heeded by consumers, it will save them well over $50,000,000 a year and greatly hamper the refiners' recent publicity campaign to increase frequency of oil change by consumers. $50,000,000 is the estimated extra income that would be collected by the oil companies as a result of the needless waste involved (in normal use of a car) in the advertising-stimulated practice of changing oil at 1250 miles. (See CR's June 1940 **Bulletin** for a brief discussion of frequency of oil change.)

### The Problem of Excess Tire Wear

We have already mentioned the waste of tire tread due to excessively high speed. In fact, tread wear is about twice as great at 75 miles an hour as at 45, and the danger of blowout with the implications of additional waste and losses which it involves is much increased. Fast driving is particularly harmful on hot days, since tires increase greatly in temperature above the surrounding air and the hot road surface adds to the problem of dissipating the heat. Rubber is, of course, harmed by any protracted high temperatures, especially when under stress, as in fast driving. Other ways in which tires are wasted needlessly are by quick starts and stops, and by turning corners at high speeds.

Improper front-wheel alignment brings about continuous destructive action. Improper angular relationship of the plane of the tire to the line of the axle and to the road surface, which often develops in a car due to hard use or abuse, is responsible for uneven wear, and hastens tire failure. If inspection of the front tires discloses cupping, uneven wear, or excessive wear at any one point of the circumference, the chances are that the wheels are out of alignment in some respect. Unfortunately, consumers have had good reason in the past to doubt the competence and honesty of some of the front-wheel alignment stations. The problem is a complex and difficult one, so much so that the consumer has been in no position to determine for himself whether the work done was correctly done (or done at all). For this reason there have been, no doubt, a good many quack alignment adjusters in the business. Nevertheless, if tire tread damage of a kind already mentioned is occurring, it would be worth while to make inquiries locally from some dealer or consumer in whose judgment one has confidence, in order to locate an alignment specialist who can be trusted to do an honest job and one which does not involve needless or exaggerated expense.

Much front-wheel misalignment is needlessly caused by coming in sharply to a curb and striking the wheel slantwise against the curb. This injures tires, too, and may often lead to failures and blowouts. The best average tire mileage is obtained when the tires, including the spare, are shifted systematically[3] from time to time.

It is fairly well recognized that a break-in period under **lighter-than-normal** service conditions is beneficial for new tires, and some even hold that unused tires deteriorate more rapidly than tires in use. This would indicate that for the majority of consumers (i.e., those who use their cars less, or for shorter trips, in the winter than in the summer) tire mileage will be favored by putting new (and spare) tires into service in the late fall or early winter season when tire loads and road temperatures tend to be more favorable. If new tires are to be installed during the summer, they should be run for two or three thousand miles, on the front wheels, later transferred to the rear wheels.

* * *

Singly, perhaps, these points seem unimportant but together they total up to very substantial savings in gasoline, oil, tires, and engine life. For our part, we believe that it is a good thing, in general, that Americans will again find reason to acquaint themselves with the available and practical means to economy and efficiency in their use of appliances upon which so much of modern living depends.

[3] The Greater New York Safety Council is reported as recommending the following method for shifting tires: ". . .the right rear, which receives the most wear, should be placed on the spare; the spare placed on the left front which receives the least wear; the left front brought back to either rear wheel [CR prefers transferring this to *right* rear]; the left rear carried forward to the right front, and the right front tire placed on the remaining rear position."

# Children's Underwear

KNIT UNDERWEAR is popular and particularly suitable for children, for several reasons. It is elastic and hence fits well without being tight and unduly binding the body; it is porous, too, and permits evaporation and absorption of moisture. Good quality knit underwear keeps the body warm in winter and cool in summer, is soft and pliable and yet will withstand many launderings.

For fall and winter, and sometimes for spring wear also, in temperate climates, the cotton knit garments are very popular, but for cooler regions cotton and wool mixtures may be found desirable. Rayon and mixtures of cotton and linen, on account of their light weight, are popular as summer wear, but linen underwear is too expensive to be of much general interest. Both one- and two-piece knitted garments are popular.

The elasticity of knitted underwear (ability to stretch and go back into shape) and fineness of the fabric stitch depend upon the "cut" or "gauge," referring to the number of needles per inch on the needle bar of the knitting machine. The more needles per inch, the higher the "cut" and the more wales (vertical ribs) per inch of fabric (see Fig. 1). At the time of knitting, each "needle" corresponds to a single wale, hence the same figure would represent the number of both the needles and wales for the fabric; but after dyeing and finishing, there are more wales (and courses) to the inch than there were at the time of knitting. The crosswise rows are known as courses (see Fig. 2). The number of stitches per square inch[1] (product of wales by courses) and the thickness indicate whether the fabric is fine or coarse.

The most commonly used knitted fabric for underwear is rib knit having small, single ridges on both the right and wrong sides of the material. Tuck-stitch material is knit loosely and has an uneven surface texture. Panel ribbing receives its name from the paneled pattern produced in the fabric by the knitting. Flat stitch (also known as jersey or balbriggan) has a relatively flat or smooth surface and, although it does not have quite the elasticity of rib-knit fabric, it has good wearing qualities. Most knit fabrics will run if a thread gets broken.

Knitted garments sold for winter wear often have the inner surface napped or fleeced. Such garments feel warmer and are as a rule a little heavier.

To obtain accurate fit, it is wise to take with you the child's measurements for comparison with the garments to be purchased; if your child is growing fast, be sure these measurements have been taken recently. Size markings, accurate or not, can then be disregarded, and the garment actually measured before purchasing. Be particularly careful to allow for sufficient length in the crotch to give plenty of freedom of action without binding; be sure that there is sufficient room in the neckline to pass over the child's head easily. Self-help features for young children are a great boon, if they are truly self-help aids and are not mere added complications of the dressing process. Seams should be neatly and strongly sewn and have no rough edges. Examine the security of attachment of buttons or other fastening aids and see that buttonholes are firmly and neatly finished.

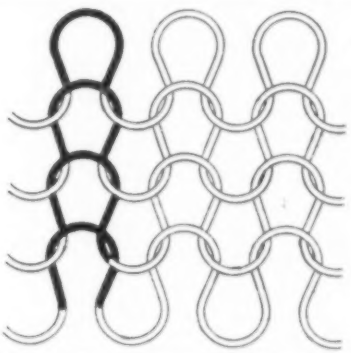


**Fig. 1 Diagram showing wale.**

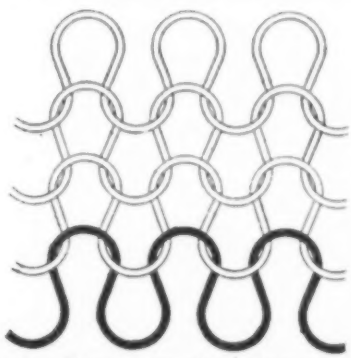


**Fig. 2 Diagram showing course.**

[1] Corresponding to the product of the two thread-counts in a woven fabric.

Most of the garments bought for test were made of one of the cotton knit fabrics already described; four samples of part-wool garments were tested also, for the benefit of subscribers who desire that type. Both union suits and two-piece garments were included. Some of the union suits had buttons half way down the front (half button front) while others had buttons all the way down (full button front). Where collarettes were used, they were made of two layers of knit material with the wales parallel to the length, with two exceptions. One of these was knit with the wales perpendicular to the length of the neck opening (French welt); the other was an elastic neckband. In union suits of the step-in style, necklines were finished with drawstrings or depended on elasticity of neck opening for entry.

All garments were measured as received from the stores, at all requisite points, for compliance with the size standards published in 1935 by the Underwear Institute. Three systems of markings to indicate size were found. A few garments were marked with the chest size, i.e., 20, 22, 24, 26, etc.; others with the age size, 2, 4, 6, 8, 10, etc.; while still others carried a combination of the two methods. Other marking systems may be found, such as infants, medium, and large, or 1,2,3,4,5,6, etc. These several methods lead to confusion and have long been a cause of irritation and wasted time in the buying of children's underwear. The extent of this confusion is incredible to one who has not seen the actual tabulations showing measurements of garments in relation to size designations.

The standardization of both *sizes* and *markings* upon a simple enough basis that it can be made intelligible to the consumer, is long overdue for this trade. The so-called standard measurements adopted by the Bureau of Standards (and presumably, thereby, the ruling practice of the industry until withdrawn) differ in the measurements corresponding to particular size designations from some later ones of uncertain status, apparently adopted tentatively by the Underwear Institute in 1935. The government standard perpetuates, it seems very unwisely, a dual numbering system by which a given size may be called either **8** ("age") or **26** (or, in a larger size, **18** or **36**).

A comparison of the actual measurements of the garments tested, with the Underwear Institute standards, showed the garments to be fairly accurately sized (without respect to the soundness of the designating system used, already discussed), though there were some deviations from the Underwear Institute standards.

Each garment tested was given a careful examination to determine types and quality of stitching, general construction, and quality of workmanship. Constructions showing raw edges, lumpy seams, or careless workmanship in other ways were adjudged unsatisfactory.

Properties of the fabrics themselves were determined by extensive tests, which included measurements of thickness, number of wales per inch, and courses per inch. Breaking strength and elongation were tested on a standard Amsler pendulum-type testing machine. Most of the ribbed fabrics tested showed the characteristics usual with knit goods of this type, i.e., low elongation and high tensile strength when measurements were made in the same direction as the ribs, and high elongation and low tensile strength across the ribs. Since all the garments were satisfatory in respect to seam strength this quality was taken to be unimportant for establishing relative ratings. Shrinkage was considered of great importance in judging the quality of underwear fabrics. Measurements were made on the garments as purchased, after one washing, and after six washings by a good commercial laundry.

In making the final ratings, greatest weight was given to the quality of the fabric, with construction and workmanship, and accuracy of sizing also taken into consideration. Garments were white cotton, rib knit, and of average fineness, unless otherwise noted. All samples were purchased in the Middle West, in most cases from large Chicago department stores. Ratings are cr41.

### A. Recommended

*Adjusto-Bak* (Augusta Knitting Corp., Utica, N.Y.) $1. Half button front, drop-seat union suit with replaceable elastic. Size 6. Available in boys' sizes 4 to 8 and in girls' sizes 4 to 16 at same price. Elongation (stretch before breaking), greatest of the cotton suits tested; tensile strength, above average. Launderability: average, with considerable lengthwise shrinkage and increase in thickness of material. Second best fabric of those tested, all factors considered. Inaccurately sized in some details. Construction, fair. **2**

*MeDo* (Thomas Dalby, Watertown, Mass.) $1.20. Half button front, drop-seat union suit. Size 4. Available with or without sleeves in boys' sizes 4 to 8 and in girls' sizes 4 to 16 at same price. Elongation, average; tensile strength, high. Launderability: excellent; shrinkage, slight; increase in thickness, below average. Fabric, best of all included in the test. Garment was accurately sized. Construction, fair. **3**

*Quickees* (Boston Knitting Mills, Inc., Newton, Mass.)

$1.35. Cream color, Swiss rib, drop-seat, step-in union suit, with elastic neckband; 10% wool, 15% rayon (in stripes), 75% cotton (as represented on tag). Size 4. Available in boys' sizes 4 to 8 and in girls' sizes 4 to 16 at same price. Elongation, second best of fabrics tested; tensile strength, somewhat low. Launderability: good; shrinkage, slight; increase in thickness, about average. Accurately sized. Construction, good. 3

*Vanta* (Earnshaw Knitting Co., Newton, Mass.) $1.25. Panel-ribbed, drop-seat, step-in union suit, with drawstring at neck. Size 10. Available in boys' sizes 4 to 8 and in girls' sizes 4 to 16 at same price. Elongation, average; tensile strength, low. Launderability: very good; shrinkage, less than average; very slight increase in thickness. Accurately sized. Construction, excellent. 3

## B. Intermediate

*E-Z* Winterweight (E-Z Mills, Inc., 57 Worth, N.Y.C.) 69c. Cream-colored cotton, rayon striped, full button front, buttoned drop-seat union suit. Size 12-13. Available in sizes 4 to 12-13, same price. Fabric rather coarse. Elongation and tensile strength, average. Launderability: fair; shrinkage, somewhat less than average; increase in thickness, greater than average. Accurately sized. Construction, fair. 1

*Nazareth* (Nazareth Waist Co., 366 B'way, N.Y.C.) 69c. Cream-colored cotton, rayon striped, full button front, drop-seat union suit. Size 8, 26. Available in sizes 4 to 12 at same price. Fabric rather coarse. Elongation, less than average; tensile strength, average. Launderability: good; increase in thickness, least of all the fabrics tested; considerable crosswise stretching resulted from the launderings. Accurately sized. Construction, poor, with many raw edges; except for this, garment would have merited an *A* rating. 1

*Pilgrim*, Sears-Roebuck's Nos. 16—7028 and 16—7029. 58c plus postage. Cream-colored, rayon striped, two-piece suit. Size 4. Available in boys' and girls' sizes 2 to 8 at same price. Elongation and tensile strength, average. Launderability: good; shrinkage, about average. Inaccurately sized in some respects. Construction, fair. 1

*Three Seasons* (Standard Knitting Mills, Inc., Knoxville, Tenn.) 69c. Gray mottled cotton, knee-length, full button front, lap-seat union suit. Size 14. Available in boys' sizes 8 to 16 at same price. Fabric somewhat coarse. Elongation, average; tensile strength, above average. Launderability: very good; shrinkage, slight; increase in thickness, more than average. Accurately sized. Construction, fair. 1

*Comfytogs*, Montgomery Ward's No. 29—1020. 69c plus postage. Cream-colored cotton, rayon striped, full button front, drop-seat union suit. Size 4. Available in girls' sizes 2 to 12 at same price. Coarsest of the fabrics tested. Elongation, below average; tensile strength, lowest of fabrics tested. Launderability: excellent; shrinkage, least of garments tested; increase in thickness, only slight. Inaccurately sized in some respects. Construction, fair. 1

*Klad-ee*, No. 6050 (Klad-ezee, 241 First Ave. North, Minneapolis) $1.10. Full button front, drop-seat union suit. Size 6. Available in boys' and girls' sizes 2 to 12 at same price. Elongation, below average; tensile strength, highest of fabrics tested. Launderability: fairly good; shrinkage, above average lengthwise; increase in thickness, about average. Third best fabric of those tested. Accurately sized. Construction, poor; otherwise would have warranted an *A* rating. 2

*Carter's Tyke Tops* and *Tykes* Pantie (Wm. Carter Co., Needham Heights, Mass.) $1.30. 2-piece. Size 4. Available in sizes 4, 6, and 8 at same price. Tensile strength and elongation, average. Launderability: fair; shrinkage, greater than average; increase in thickness, less than average. Pantie slightly smaller than size requirements. Construction good. 3

*Utica Springtex Bodygard* (Utica Knitting Co., Utica, N. Y.) $1.19. Mottled brown cotton with 25% wool as label claimed. Ankle-length, long-sleeved, full button front, lap-seat union suit. Size 12. Available in boys' sizes 8 to 16 at same price. Fabric coarse. Elongation and tensile strength, slightly below average. Launderability: fairly good; shrinkage, about average; increase in thickness, about average. Accurately sized. Construction, fair. 3

## C. Not Recommended

*Hanes* Heavy Weight (P. H. Hanes Knitting Co.) 69c. Knee-length, full button front, lap-seat union suit, with French welt collarette. Size 10. In boys' sizes 8 to 16 at same price. Fabric rather coarse. Elongation and tensile strength, above average. Launderability: poor; shrinkage, excessive. Inaccurately sized; trunk length, 3½ in. shorter than standard. Construction, good. 1

*Lifalco* (Little Falls Mfg. Co., Little Falls, N. Y.) 59c. Cream-colored cotton, rayon striped, 2-piece suit; shirt buttoned to the waist. Size 4-5. Available in infants' sizes only at same price. Fabric coarse. Tensile strength, below average; elongation, average. Launderability: fairly good. Sizing, only slightly inaccurate. Construction, poor. 1

*Cuddles* (Manufacturer not known) 89c. Pink, tuck-stitch, bodice-top union suit; 5% silk, 20% wool, 25% rayon, and 50% cotton. Size 16. Available in girls' sizes, small (8), medium (12), and large (16) at same price. Rather loosely knit. Elongation and tensile strength, satisfactory. Launderability: very poor; shrinkage, exceptionally high, so that garment was practically unwearable after 6 washings. Accurately sized. Construction, fair. 2

*Munsingwear* (Munsingwear, Inc., 718 Glenwood, Minneapolis) 98c. Brown mottled cotton, knee-length, full button front, lap-seat union suit. Size 8. Available in boys' sizes 8 to 16 at same price. Fabric coarse. Elongation, below average; tensile strength, above average. Launderability: rather poor; shrinkage, greater than average. Inaccurately sized; trunk, 3½ in. shorter than standard. Construction, fair. 2

*Speedon* (The "E-Cut" Knitting Mills, Royersford, Pa.) 89c. Drop-seat, step-in union suit. Size 12. Available in sizes 2 to 12 at same price. Fabric finer than average. Elongation, lowest of fabrics tested; tensile strength, above average. Launderability: rather poor; shrinkage, considerable; increase in thickness, about average. Inaccurately sized in some respects. Construction, fair. 2

*Princess May Interknit* (Augusta Knitting Corp.) $1.30. Pink, 2-piece suit, Swiss rib, with bodice top. 5% silk, 20% wool claimed; about 5% silk and 16% wool found. Size 14. Available in girls' sizes 8 to 16 at same price. Fabric very fine. Elongation, above average; tensile strength, satisfactory. Launderability: very poor; shrinkage, excessive. Considerably below size requirements, but fabric had unusual stretchability (elongation). 3

# New Siding Over Old

## Useful Information on One of the Important Problems of Rehabilitating an Old House

by Stephen J. Potter, Architect

IN THE LAST FEW YEARS, application of new siding to old houses has become a thriving business. Manufacturers now offer a variety of siding materials for this use, some of which are believed to afford a real improvement over the older products.

One of the new materials is a fiber-back, insulating, "brick-face" siding. The fiber backing is ½ inch thick and is coated with asphalt. Its mineral and asphalt surface coating is designed to imitate face brick. Other sidings of importance are asbestos, asphalt, and wood. Although wood is not new as a siding material, its method of application has been recently improved. This article discusses these materials from the standpoint of their use for remodeling rather than for new work.

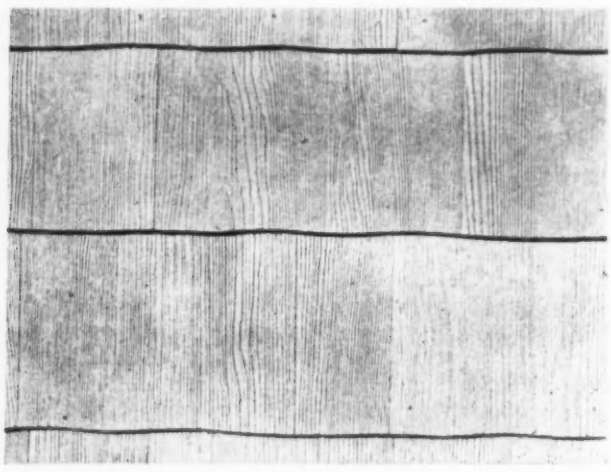


**Fig. 1 Asbestos shingle-style siding.**

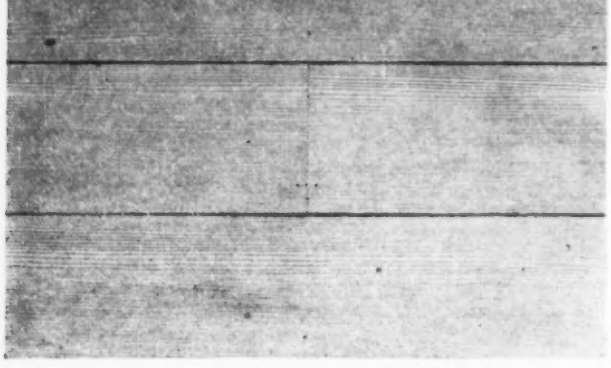


**Fig. 2 Asbestos clapboard-style siding.**

### Types of Siding

**Asbestos siding** has become a leader in the siding field. It is made by combining asbestos and Portland cement into hard, rigid slabs. These make good siding, with but one serious fault, i.e., they are brittle. The fibers of asbestos are not the type to form a tough exterior wall surface. They resist fire and weather, however, to a commendable degree. Assuming that expert mechanics have installed your siding, brittleness is of importance only for those parts within everyday reach. Hard knocks, banging of a ladder against the house, a blow from a baseball or falling limb, will chip and crack the material. To safeguard as much as possible against this type of damage, do not buy a poor grade of asbestos siding material.

Surface treatment of asbestos siding, such as painting, is not necessary (as it is with wood) to prevent deterioration. Like any other kind of exterior wall, however, it will become discolored with age, and there is a special paint available for decorating this type of siding. For the first 10 or 15 years, washing the surface should be sufficient, except in areas where the atmosphere is dirty. It appears that asbestos siding will not curl or warp with changing weather conditions, for installations made 35 years ago are still sound. It is judged that, with the improved present-day methods of manufacture, the expected life of asbestos siding may be 50 years or more.

Asbestos siding is usually made to imitate either wood shingles or wood clapboards. In these forms, it has been enthusiastically accepted by the public, even in communities of expensive homes.

From the standpoint of appearance, the "hexagonal" or "French" shingle is suitable

only for use on commercial or low-valued property. It has poor "scale," as the architects say, and is meaningless in design.

The insulating value of asbestos siding alone is not high, being comparable with that of asphalt siding. When properly installed with a felt backing and filler strips, however, it will give some added warmth. Under normal conditions, the average fuel saving due to the new siding is estimated to be small.

**Asphalt siding** is made with a heavy felt base, saturated with asphalt, and then surfaced with mineral particles, often in a design to imitate face brick. It comes in strips and in rolls. Weights vary from 110 to 250 pounds per square (a square being 100 square feet). The heavier grades are more desirable. This siding is the most popular of the various imitations of brickwork. Although it does simulate brickwork, it is, of course, recognizable as an imitation. There is no substitute material known that can truly give the solid depth in appearance and true color and texture of brick.

Asphalt siding is flexible and fairly tough when new. It is easier than asbestos to install, particularly around openings. While its mineral surface resists flame, it will burn freely after it has been ignited. It resists weather and needs no painting or other external treatment. Its insulating value is comparable with that of asbestos siding, as already mentioned.

Asphalt siding has the serious disadvantage that it will crack and break easily after about 15 years of service, due to the slow drying out with age of the substances which make it plastic and flexible. Its appearance is considered unsuitable for many uses. For restoration of run-down, low-valued property, however, this siding has a definite place. It will delay costly upkeep for several years and will improve the appearance and add years of life to the run-down building. In cold climates special consideration must be given to its installation (see *Installation*).

**Wood siding** as a remodeling material is fast losing ground to the newer types. In many ways, however, it is still as good as it is old. Red cedar, the most popular wood for siding, is weather resisting, tough, and slightly flexible. If it were not for the fact that painting is necessary to improve its looks and add to its life, it would never have given way to manufactured materials. It is still the most popular siding in new work. Wood siding is one of the cheapest kinds to install, except for cost of painting. Properly maintained with paint or creosote stain, the life of red cedar shingle or red cedar bevel siding is very long.

Shingles should be not thinner than 2/5 inch, i.e., 5 shingles should measure at least 2 inches thick at butts. Partly because of greater thickness and greater overlap, red cedar shingles or bevel siding offer appreciably greater resistance to passage of heat and cold than either asbestos or asphalt brick siding. From the standpoint of appearance it is considered very satisfactory. (Remember that in restoring an old colonial frame building, the proper material to use is one that is very close in character and appearance to that which was used originally.)

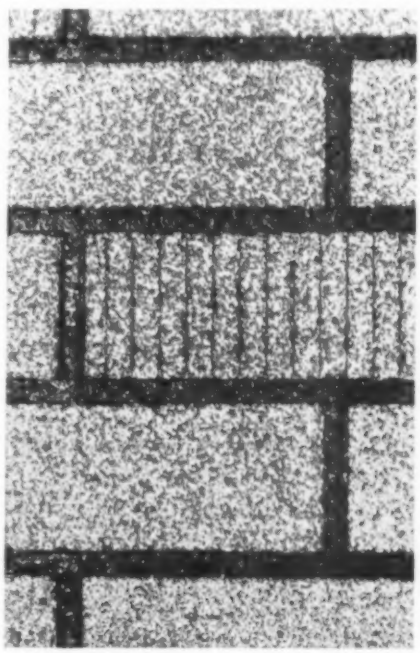


**Fig. 3 Asphalt siding in brick design.**

**Fiberback, insulating, "brick-face" siding** comes in the form of boards, approximately ½ inch thick. The fiber back is sealed in asphalt and the other surface is coated with mineral particles that are embedded in asphalt and marked to imitate brick. At first, failure to waterproof the fiber backing caused considerable trouble. In absorbing moisture, the backing would swell and buckle. Subsequently the manufacturers sealed the board with asphalt. The facing has also been improved in appearance and is undoubtedly the closest imitation of brick on the market today. In cold climates, special consideration must be given to its installation (see *Installation*).

This siding is strong and rugged when new; how long it can resist weather and retain its strength can only be guessed. Asphalt loses its resistance against moisture when dried out; hence, the siding should last little longer than the protecting asphalt seal. The value of this fiberboard siding as insulation is greater than

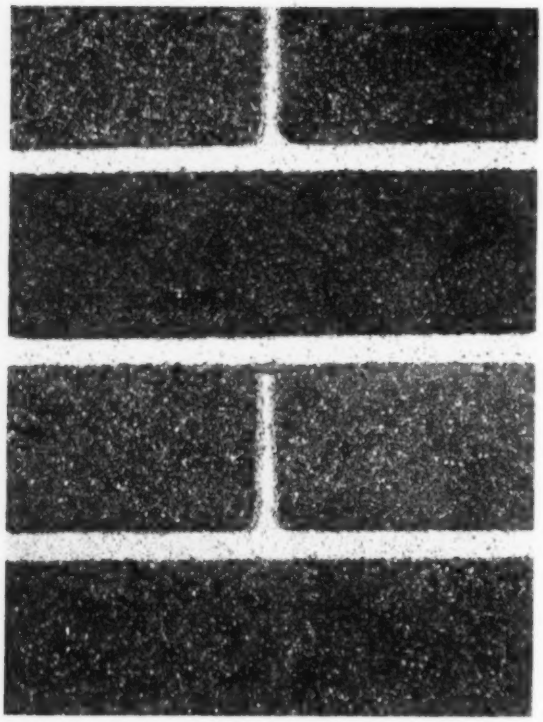


**Fig. 4 Fiber-back, insulating, "brick-face" siding.**

that of the other common sidings. In resistance to fire it is similar to the commoner type of asphalt siding. Lately it has been gaining in popularity.

**Stucco,** in addition to the sidings which have been discussed, should also be mentioned as a material sometimes used in renovating exterior walls. The stucco which gives the least trouble is the kind made with Portland cement, sand, and lime.

Most architects hesitate to recommend stucco on frame construction. Since the expansion and contraction of wood and stucco are very different, cracks are almost sure to develop in time; sometimes very serious and destructive cracking occurs. However, where metal lath reinforcing, such as *Steeltex*, is used, a high percentage of such jobs has been successful. The climate of the northern states is far more variable, especially as to extremes of temperature, than that of the southern states; as one goes toward southern latitudes, stucco becomes more practicable as a siding on frame construction.

Stucco can be used as a surfacing on masonry walls in any climate provided the surface of the existing masonry wall is porous enough to afford suction or adhesion for the cement-sand-lime mix. Never try to use stucco on a glazed or other **smooth** masonry surface.

## Costs

Comparing initial installed costs of the various types of siding and assuming that experienced labor and the best materials are used, asbestos siding in the form of shingles is, rather surprisingly, often the cheapest. In one locality, for example, in comparison with asbestos shingles, asphalt siding, made to resemble brick, is 10% more expensive; wood siding, if painted or properly stained, is also 10% higher priced; and fiber-back, insulating, "brick-face" siding, 30% higher. Considering the matter not on a first-cost basis but over a long period, say 150 years, the comparative cost of asbestos siding would appear to be still more favorable than these figures would indicate.

If we assume that the life of wood siding (properly painted with one coat of the right paint at intervals of 3 years) is 150 years, the life of asbestos siding may be taken as 50 years and that of asphalt as 20 years. So far as relative long-time costs are concerned, and remembering that painted wood and asphalt shingles cost 10% more than asbestos, the total costs for wood over the long period of 150 years has been variously estimated at from 3 to 7 times as much as for asbestos, and for asphalt, 2-2/3 times as much.

All of these comparisons are, of course, only rough approximations, and relative costs will vary according to locality. Because the probable life of fiber-back, insulating, "brick-face" siding is quite uncertain, the long-time cost for this product is not estimated here.

## Installation

When adding new siding of wood, asbestos, or asphalt to old buildings situated in cold climates, some consideration must be given to the permeability of the covering to water vapor. The surface should be water resistant **but not very vapor resistant,** i.e., the surface should shed the rain but permit water in the form of vapor to pass through. The reason for this is that in cold climates water vapor tends to pass through the exterior walls of a house from the inside toward the outside. If there is a vapor-resistive material at or near the outside surface, the vapor cannot escape readily and will condense during cold weather. Water accumulating in this manner may cause progressive decay in the structural portions of the wall and may also be a cause of paint peeling and other paint failures on wood siding and finish. The sheath-

ing paper that is generally used under new siding must be chosen with this in mind. Some sheathing paper is too vapor resistant to be satisfactory for use in cold climates. The 35- to 50-pound asphalt-impregnated and surface-coated sheathing paper with glossy surface is not suitable, being too impermeable to the outward passage of water vapor from the house. On the other hand, papers known in the trade as slaters' felt, sheathing felt, and tarred felt are satisfactory (except for asphalt siding).

It is important in all cases that all original siding, corner boards, water tables, etc., should be securely in place before putting on new siding. Loose boards should be renailed. Any corner boards and water tables that project more than ⅛ inch beyond the existing siding should be replaced with thinner strips or else planed down until they are flush.

Asbestos, asphalt, and usually red cedar bevel siding should be laid only on a smooth surface. When covering old shingles or clapboards, wooden filler strips are necessary. These strips are beveled to fill the wedge-shaped space caused by the lap of the old siding, and once nailed in place will form a smooth surface. In clapboard houses which have no sheathing beneath the clapboards, the beveled strips should be nailed to the uprights. The proper type of sheathing paper should be used, and drip cap covers should be installed over all openings.

When asbestos clapboard siding is used, asphalt strips must be nailed in place under the joints, since the lap provided is only 2 inches or less. Asbestos siding, either shingles or clapboards, always comes drilled for nailing; hence, proper spacing of nails is assured. A chalk line (a light cord rubbed with chalk and used to make a guide mark or line on a surface by being snapped or released against it) should always be used as a guide to ensure an even job in placing the shingles. Unexposed nails may be copper or galvanized, but for all exposed face nailing, cadmium-plated brass nails or some other nail that will not rust or cause stains should be used. Zinc is preferable to copper for corner beads and flashing. Corner beads are often used; these serve two purposes: they form a definite corner to which the siding is butted, and they protect the corners from possible damage. (However, carefully formed corners without corner beads are considered to have better appearance.) Caulking is important around all openings. Be sure that the caulking compound is of the asbestos type.

Asphalt siding comes usually in strips or rolls similar to those of asphalt roofing. Never use felt under asphalt siding, for the felt will expand and creep with enough force to cause the siding to bulge. In laying these siding strips, it is best to use copper nails throughout. Corner beads and flashing, which may be of copper, should always be installed. A chalk line should be followed in laying asphalt siding, as with other types. Caulking with an asphalt cement around all openings is important. Since any siding made of asphalt is highly vapor resistant, it is recommended, when asphalt siding is to be applied to a heated building situated in a cold climate, that ventilation be especially provided for in the space behind the new siding; unless means can be provided for elimination of moisture from back of this type of siding, its use is not recommended.

The application of wood shingle siding is unlike that of wood bevel siding; wood filler strips should be used under bevel siding but are unnecessary under shingles. Bevel siding is most commonly used in 6-, 8-, and 10-inch widths. An 8-inch board lapped 3 inches gives a much better job than a 6-inch board lapped only 1 inch.

Red cedar shingles come in various lengths, the most common lengths being either 16, 18, or 24 inches. Remember first of all to buy No. 1 grade shingles. On exterior walls, weather exposure should never be greater than ½ the length of the shingle, less ½ inch. If wood shingles must be exposed more than 9 inches to the weather, they should be face nailed, or curling will occur. But use of face nails causes cracks and gives a bad appearance. Again, a chalk line should be used. Helpful directions for using red cedar shingles will be found in **Roofs and Exterior Walls of Red Cedar Shingles —Bul. 540,** a 48-page illustrated pamphlet, free from Extension Service, Oregon State College, Corvallis, Ore.

Fiber-back, insulating, "brick-face" siding comes with a shiplap edge to provide an approximately airtight overlapping joint. Present practice is to use mason lath as nailing strips under the joints. The siding itself is commonly nailed with 2-inch galvanized screw nails. Since this siding is comparatively new, experience is lacking as to the suitability of currently used installation methods. If it is to be applied to a building situated in a cold climate, ventilation should be provided (see asphalt siding in paragraph 1 of this column).

## Portable Radios

[continued from page 5]

### C. Not Recommended

*Fada*, Model C33 (cont'd)
cult. Had sensitivity of this set been better, it might have warranted a *B* rating. **1**

*Motorola* "Playboy," Model A-1 (Galvin Mfg. Corp., Chicago) $19.95. Price of replacement batteries, $2.70 ("A" battery consisted of 1 standard flashlight cell). 4 tubes; was intended for battery operation only. Size of case, about 6½ x 4½ x 3½ inches. Weight, 4 lb 7 oz. Sensitivity, lower than *Emerson*, Model 432. Selectivity, satisfactory. Tone quality, not quite so good as that of *General Electric LB-603*. Construction of case and quality of parts, fair; quality of workmanship, fair to poor. Considered rather difficult to service. **1**

*Admiral Bantam*, Model 29-G5 (Continental Radio & Television Corp., Chicago) $24.95. Cost of replacement batteries, $2.70 ("A" battery consisted of 2 standard flashlight cells). 4 tubes plus usual rectifier tube. Size of case, 4½ x 8½ x 3¾ inches. Weight, 4 lb 13 oz. Sensitivity, best of miniature sets tested. Selectivity, satisfactory. Tone quality, about on a par with *Motorola* "Playboy." Case made of plastic and of thin, weak construction. Quality of parts average, of workmanship poor. Considered difficult to service. When operated from house current, leakage current of this set was excessive. **2**

## Heating Systems

[continued from page 8]

ordinary household heating furnaces. This difficulty could be overcome by placing the furnace in a shallow brick- or concrete-lined pit dug in the cellar and using a removable platform or box at the front part of the furnace pit to stand on for refueling.

One common type of accessory equipment is the forced-draft blower controlled by a thermostat. With ashpit blowers, the draft can be increased so that a sufficient amount of air can be forced through fine coals—for example, buckwheat coal—in the ordinary type of furnace (with a fine-mesh grate). The power cost for operating such a blower for an average-sized home may be estimated at about $10 a season (at 5 cents per kilowatt-hour). Though claims of increased efficiency are often made for blower systems, it is doubtful whether greater efficiency will be achieved, and there is one really important factor which is usually not mentioned, namely, that rather violent explosions of gas in the furnace may occur unless considerable care and skill are used in the firing. Even with furnaces not so equipped, gas explosions have caused deaths through carbon monoxide poisoning. Ashpit-blower-type systems are, therefore, considered to be of questionable merit.

Thermostats are now in common use with hand-fired as well as with automatic equipment, but even they have minor disadvantages, one being that during a sudden cold snap the fire may be burned out before more fuel is added. During very mild weather of fall and spring, however, thermostats are a real convenience.

Stokers used with bituminous coal can be counted upon to save about half the time of tending the fire. A stoker installation should include an automatic draft regulator which will make operation more reliable and reduce the danger of the fire's going out through the fuel's being all consumed.

One of the advantages of anthracite is that, with its use, stokers are available with bin feeds and with automatic ash-removal devices of such nature that the attention required to maintain a fire can be reduced to a visit every week or so. However, the mechanism that removes ash receives more severe treatment than that which feeds coal; whence ash-removal stokers generally need more attention, besides requiring a greater initial outlay. Stokers produce considerable quantities of very fine ash, or "fly-ash," which makes necessary more frequent cleaning of boiler, furnace, and smoke pipes than is required with hand-firing.

Cheaper coal can be used with stokers than is usual with hand-firing in the conventional type of hand-fired furnace, and this more than compensates for the cost of the electric power required to run the stoker (from 150 to 300 kilowatt-hours for the average winter in a six-room house in the East, Midwest, or Northwest).

### Oil and Oil-Burning Equipment

Difficulties experienced in earlier years with operation and maintenance of oil burners have been much decreased by recent improvements and new controls, so that nowadays trouble-free, clean operation is the rule rather than the exception.

Pressure-atomizing oil burners are the most popular type, though less efficient than the wall-flame vertical-rotary type of burner when used in the common round boiler. The parts of pressure-atomizing oil burners are now so standardized that needed repairs can be made by any reliable heating-service artisan. Rotary burn-

ers cost more initially and are likely to present more difficulties in getting quick service in an emergency.

A third type of burner, now becoming more common and developed principally for use in low-cost housing projects, is the pot-type burner. Of these, the acceptable models have motor-driven air blowers running continuously, serving to prevent the accumulation of carbon in the pot which gave so much difficulty with the older natural-draft pot-type burners. These new pot-type burners, though inexpensive, are considered best not used in homes requiring the equivalent of over 300 square feet of radiation (steam).

When one considers selecting and installing an oil burner, it is well to remember that a slow rate of firing, though the burner has to run a larger proportion of the time, is more economical than a high rate of firing. For example, when heating an eight-room house, a firing rate of one gallon of oil per hour would cost (at usual rates for oil and electricity) about $15 less for the season than a firing rate of one and two-thirds gallon per hour.

The impending or probable fuel oil shortage in the East (and possibly other sections) has been widely discussed in the press, and just how serious the hazard is of oil fuel being insufficiently supplied for house heating, no one at this time can say. Certainly it should be considered very carefully by anyone proposing to install an oil-fired heating plant. It is significant that some of the oil companies have replaced their own oil-burning heating equipment with coal-burning units. There are some who think it would be most unwise for anyone to install an oil-fired house-heating furnace until the present uncertainties are cleared up by responsible engagements of the proper government officials to see that fuel is or is not to be furnished to stated regions. The matter is, of course, practically out of the hands of oil company managements.

### Gas and Gas-Burning Equipment

The most convenient, least troublesome, most dependable, and cleanest fuel is gas. No storage is required and the fuel is paid for only as consumed. Its great drawback is its cost. Where only manufactured city gas is available, the cost for heating with gas is apt to run from 50 to 100% more than with coal (assuming gas of 530 Btu per cubic foot and costing 60 cents per 1000 cubic feet). Where natural gas is available, the cost of heating with gas may be as low as or lower than heating with coal.

Gas is an extremely dangerous substance if burned under any but the most technically exact and controlled conditions in so large a unit as a house-heating furnace, whence only gas burners bearing the seal of approval of the American Gas Association (A.G.A.) should be considered. These will have adequate safety devices to minimize dangers of explosions, and a certain minimum efficiency when used in recommended boilers or furnaces. Certain makes are generally sold by the public utility company selling gas, and, for the sake of obtaining the especially good service likely to be provided, it will probably be wise in most cases to purchase one of those makes.

## Boilers

Boilers which come joined with automatic heating equipment are generally more efficient than the usual hand-fired boilers converted to automatic heating. Boilers of steel are sometimes to be preferred to those of cast iron because of their greater efficiency in extracting heat from the fuel. A measure of this efficiency is the temperature of the gases leaving the boiler and entering the smoke-hood. The stack temperature should never exceed 600°F at the maximum rate of firing. Boilers capable of producing outflow temperatures of the gases of combustion at the stack as low as 400° to 500°F are readily obtainable. As compared with cast-iron boilers, which occasionally crack, steel boilers do have one disadvantage, viz., a greater likelihood to develop leaks.

A boiler or furnace actually designed for burning either oil or coal should be considered by those who would like to burn oil but wish to take prudent account of the impending shortage of fuel oil. Such a furnace should be one so designed that its grates can be removed and the doors sealed, to permit later installation of a conversion oil burner.[2] If this equipment is fitted for oil burning and then subsequently a shortage of fuel actually arises, the burner can be removed temporarily, the grates reinstalled, and coal burned during the emergency. In planning such an installation, it is important to select a boiler or furnace with a large combustion space, a long path of travel for the gases of combustion, and ample flue surface to

[2] A conversion oil burner is one suitable for introduction into a furnace formerly designed for burning coal.

absorb the heat. Such a unit will have an efficiency pretty nearly as high as that of the average boiler-burner combination specially designed and built for oil fuel. The difference may be about 5%.

## Furnaces for Home-Heating Plants

With automatic warm-air heating equipment, the furnaces should be of steel, for cast-iron furnaces are more apt to crack and allow fuel gases to enter the ducts. There has been too much of a tendency, which it is expected will now be accentuated due to defense shortages of metal, to make furnaces of too thin a gauge of steel. The furnace top or head should be at least 8 gauge (0.164-inch thick) and the side 10 gauge (0.134-inch thick). If thinner metal is used, the life of the furnace is apt to be disappointingly short. The major factors making for good efficiency in use of fuel are ample heating surface (area) of parts exposed to the hot gases and radiant heat from the fuel bed or flame, and a long path of travel for the flue gases to follow before they reach the smoke pipe.

## Heating-Plant Accessories

### Domestic Hot-Water Heating

With steam-heating systems, or with hot-water heating systems in which the boiler water temperatures are automatically controlled, domestic hot water can be obtained very satisfactorily throughout the year by indirect heaters attached to the house-heating boiler. These consist of copper coils which are placed below the water line of the boiler and through which the service water circulates. This circulation is out of the bottom and into the top of a storage tank if one is used, or directly to the piping system if the submerged coils are so large that no storage tank is required. When heating coils in the boiler (or external to it) are small, a storage tank is necessary. Such a tank should be of ample size, well insulated, and located as high as possible.

The capacity of the "tankless" heater for supplying hot water for household use is, when submerged in boiler-water at 180°F, only approximately three-fifths as much as its capacity when submerged in water at 212°F; thus these "tankless" heaters require sustained high water temperatures, preferably 180°F or more. Tankless heaters have important advantages where water is so acid or corrosive that galvanized storage tanks do not last long, which is the case in some regions and cities. Note that since the heat extracted for washing, dishwashing, or bathing is not stored in a special reserve tank, the heating boiler must itself be larger when a tankless heater is installed than when there is a storage tank. One may estimate the required additional boiler capacity at 4 square feet of steam radiation or 6 square feet of hot water radiation for every gallon of domestic hot water heated per hour, heated through 100°F (e.g., from 80°F to 180°F). Where there is to be no frugality in the use of hot water, it is wise to allow about 10 gallons (assuming 100°F temperature rise) per day per adult and 20 gallons per day for each servant or child of pre-school age. It should be borne in mind, however, that running hot water unnecessarily or wastefully is equivalent to throwing away the corresponding amount of unburned coal.

In summer, as noted in an earlier paragraph, domestic hot water is often furnished through the action of an automatically fired house-heating boiler. In such cases, particular care should be taken that the boiler is very well insulated (insulation at least two inches thick); that a large storage tank is used, properly installed (high, well insulated); and that the coils furnished for heating the water are of sufficient capacity to heat the contents of the storage tank in two or three hours. If these principles are not followed, the summer supply of hot water by an automatic heating plant will prove surprisingly expensive. With warm-air heating systems (or with coal stoves) domestic hot water is sometimes obtained by a coil in the firebox. This arrangement does not work out well for a considerable part of the year, giving inadequate hot water except in cold weather and very little hot water in mild weather, so that to make it practicable, the hot-water coil will usually require to be supplemented by a small, separate, coal-fired hot-water heater.

### Heating-Plant Controls

With warm-air heating systems, there should be, in addition to any thermostat, which acts to maintain a constant room temperature, a safety switch to shut off the furnace whenever the temperature in the hot-air ducts rises too high. If an oil burner is used, the customary stack relay-switch for shutting off the burner in case of failure of the fuel to ignite is also necessary.

In addition to any room thermostat, with hot-water and steam-heating systems there should be an immersion thermostat or a pressure-switch as a protection against excessive temperatures or pressures in the boiler. There should also be the usual stack relay-switch, as just described. If the system is one which is used to heat the domestic hot water in the summertime, an immersion thermostat should be provided (convenient but not necessary with hand-firing) to control the temperature of the boiler water. This immersion thermostat is in addition to the one previously mentioned as a safeguard for hot-water systems.

The question is often asked: what is the value of lowering temperature within the home during the night hours? Such reduction of room temperatures is worth while with oil-firing and stoker-firing (and hand-firing in some cases), for a 10°F lowering at night may produce fuel-saving up to 10%. Thermostats operated in conjunction with a clock are available which will restore the room temperature in the morning automatically.

## Toilet Soaps

[continued from page 11]

utors) 52c plus postage for 12 cakes; **25c** (computed to include postage within 150 miles). Greatly exceeded Federal Specifications' limit for amount of matter insoluble in water. **1**

*Wards All Purpose*, Montgomery Ward's No. 53—4276. 43c plus postage for 12 cakes; **22c** (computed to include postage within 150 miles). Exceeded Federal Specifications' limit for sum of matter insoluble in alcohol, free alkali, and chlorides. **1**

*Camay* (Procter & Gamble) 5-2/3c a cake; **28c.** Slightly exceeded Federal Specifications' limit for amount of matter insoluble in water. **2**

*Lux* (Lever Bros. Co.) 5-2/3c a cake; **27c.** Coconut oil content, somewhat high. Slightly exceeded Federal Specifications' limit for matter insoluble in water. **2**

### C. Not Recommended

*Coleo Colgate* (Colgate-Palmolive-Peet Co.) 5c a cake; **25c.** One of two soaps in the test which exceeded Federal Specifications' limits in two respects (amount of matter insoluble in water and presence of rosin). **1**

*Fairy* Floating (Lever Bros. Co.) 3-2/3c a cake; **23c.** One of two soaps in the test which exceeded Federal Specifications' limits in two respects (matter insoluble in water and sum of matter insoluble in alcohol, free alkali, and chlorides, being far outside the limit in respect to the first). **1**

## RCA's New "Magic Brain"

THE RCA Victor's "Magic Brain" record-changer plays both sides of a record without turning it over, and will play 15 records in either sequence desired—two sides of each record, or one side of each record. Heretofore only the *Capehart* patented changer was capable of playing both sides of a record automatically, an accomplishment which has given its makers a considerable advantage in promoting sales. The new RCA changer attains the same results by employing two pickups, one for the top, the other for the bottom of the record. Both pickups are of the low-pressure crystal type and have a "permanent" sapphire stylus, said to work at a needle pressure of about one ounce. Readers are reminded that sapphire needles, though having definite advantages from the standpoint of pickup design, have certain disadvantages in use. Steel needles, on account of an abrasive which is included in the record material, shape themselves to the actual groove width and contour after a few revolutions of the record; needles of sapphire do not.

The pickups of the new changer are claimed to be capable of handling frequencies up to 8000 cycles, which if strictly true is fully satisfactory for reproducing most present-day records. Quality of reproduction, of course, depends also to a large extent on the performance of the set with which the changer is used. For the present, the unit is obtainable only in the *RCA Victor* Radio-Phonograph Combination, Model V-225, selling for about $450, but may be made available in other models later in the year. As soon as specifications or other data for this new radio-phonograph are available, indicating its probable fidelity in reproduction, the information will be made available to subscribers.

## A Note on the *ACB*

### Its Paper and Mailing Envelopes

DUE to a very abnormal situation in the paper trade, caused by government defense preparations, CR was unable to obtain the type of mailing envelopes for the *Annual Cumulative Bulletin* that has proved fully satisfactory in the past. A majority of the annual *Bulletins* were mailed in envelopes of an unsatisfactory grade, but these were the best that could be obtained, and actually cost more than the high-grade Kraft envelopes previously used. ¶A part of the issue of the *Bulletin*, too, had to be printed on paper of a lower grade than was originally ordered, but here too the situation was quite beyond CR's control. We hope our subscribers were not too greatly inconvenienced by the change in materials which had to be made unavoidably at the last minute.

# CONSUMERS' DIGEST

*The enlightened consumer is a necessary encouragement to merchandising integrity.*

## In The Groove

### With Ratings of Phonograph Records

By

WALTER F. GRUENINGER

EDITORS' NOTE: With this issue, something new in ratings makes its appearance in Consumers' Research *Bulletin*. Last June, when *Consumers' Digest* suspended publication, suggestions were received from a large number of readers that the monthly ratings of current phonograph records be carried on by Consumers' Research in the fall.

Careful consideration was given the suggestion, for, in many ways, the rating of phonograph records, based largely on aesthetic factors and interests, involves problems of a different type from the other aspects of CR service which are devoted primarily to reports of tests based on engineering and other scientific principles.

Digging into the problem a bit revealed these facts about the extent of public interest and investment in phonographs and records. In 1940 consumers in this country bought 75,000,000 phonograph records for which they paid $40,000,000, or an average of 53 cents per disc, and furthermore, in that year, they bought some 900,000 radio-phonographs. The sales figures alone indicated that the subject was one in which consumers were widely interested. It seemed therefore to be a field in which guidance by an expert judge would be helpful and appreciated, and it was decided to include Mr. Grueninger's record ratings, at least on a tentative basis. Comments and criticisms from readers are invited.

Mr. Grueninger has been a student of music since early youth. He is a performer as well as a collector and has a personal library of some 4,000 records.

The three outstanding factors on which he will rate the various recordings are: quality of music, quality of performance, and the acoustical fidelity of the recording. The rating of music is admittedly based on personal and aesthetic judgments, and there may be critics who will disagree with Mr. Grueninger's ratings. Primarily it should be kept in mind that the life of a record under proper care is well over 100 playings, and whether a music lover is likely to want to hear a particular record played that many times is an important and reasonable basis for judging the quality of the music.

NOW THAT Columbia is offering Victor keen competition, the number of new classical recordings offered to the consumer tops all previous highs. As a consequence, the consumer is urged by copywriters' superlatives from *two* principal sources to buy a new but often inferior recording. Particularly in the past two years, the fact that a recording has just come from the presses has not often meant that it offers the best interpretation and the highest fidelity. Careful, critical, patient listening by an experienced auditor, on high-fidelity equipment, determines which record is best. My own equipment consists, in the main, of an *Audak D36E* magnetic pickup using *Actone Transcription* needles (they are shadowgraphed steel needles), a *Thordarson* 2A3 (triode) phono-amplifier, and a *Cinaudagraph HW13-13* speaker mounted on a separate 5 x 6-foot baffle.

Recently, Columbia has been experimenting at the expense of the consumer with a new frequency curve as the basis for "equalizing" its recordings, and now it turns out, according to information recently received, that this has not been successful—but how many consumers bought these records and had cause to repent!

THE NEWLY ENACTED FEDERAL TAX of 10% to U.S.A. consumers who buy records will not tend to decrease demand much, in my opinion, for the consumer has never paid as little for good records as he is asked to pay today. Two-dollar *Victor Red Seal* records were standard in 1939; now they list at one dollar and may be bought for less.

It is my own opinion that recorded music no longer belongs to the hobbyist. Good music has never been so popular in this country as it is today, yet even in the field of classics, there is music that bears frequent hearing and music that bores after a few hearings. Record buyers, particularly those who have recently entered the field, need advice on how a new recording, widely advertised, is likely to stand up as an interpretation of what the composer had in mind. They need to know also how the *fidelity* of the new recording compares with the actual performance; that is, how faithfully the music,

as reproduced by an ideal or "perfect" phonograph introducing no distortions or emphases of its own, will mirror the original rendition by which the master-record was made.

It is often difficult for the individual purchaser to determine these points for himself with respect to some particular recording. For reasons which do no credit to the record dealer's judgment, the average phonograph dealer's equipment for reproduction of records is usually so inferior that the really critical consumer is unable to judge how good or how bad a record sounds until he hears it on a good reproducing machine—preferably a high-fidelity set that reproduces everything that has been put on the record.

The aim of this column is to aid consumers in sifting the good from the bad and the mediocre, and particularly to help those who live in areas where dealers rarely stock an adequate selection and where records must therefore be bought by mail, without a prior hearing.

## Ratings of Phonograph Records

*Key: AA—highly recommended; A—recommended; B—intermediate; C—not recommended.*

| | *Quality of Music* | *Interpretation* | *Fidelity of Recording* |
|---|---|---|---|
| ORCHESTRA | | | |
| **Berlioz:** *Les Francs Juges Overture* & *Roi Lear Overture.* BBC Symph. Orch. under Boult. 6 sides, Victor M803. $3.50. Noisy, dramatic, insignificant Berlioz. | B | AA | A |
| **Brahms:** *Serenade No. 2.* Alumni Orch. of the Nat'l Orch. Ass'n under Korn. 7 sides, Victor M774. $4. Scored for orchestra without violins. Dull. | C | A | AA |
| **Cesana:** *Negro Heaven.* Indianapolis Symph. Orch. under Sevitzky. 2 sides. Victor 18070. $1. | C | A | AA |
| **Handel:** *Concerti Grossi Nos. 1 & 5.* Diener & his Collegium Musicum. 8 sides, Victor M808. $4.50. Outstanding suites for small string orchestra, played with understanding. | AA | AA | B |
| **Mozart:** *Symphonies 29 & 34.* Boston Symph. Orch. under Koussevitzky. 9 sides, Victor M795. $5. Not "utterly fascinating" as the advertising claims. Rather tiresome music and second-rate interpretations. | B | B | A |
| **Mozart:** *Symphony No. 39.* London Phil. Orch. under Beecham. 6 sides, Columbia M456. $3.50. A great work conducted by a man distinguished for his Mozart. | AA | AA | A |
| **Ravel:** *Bolero.* Grand Orch. Symphonique under Coppola. 4 sides, Victor M793. $2.50. The composer approved this slow tempo, but his clasic dance still is boring. | C | AA | A |
| *American Works.* Eastman-Rochester Symph. Orch. under Hanson. 4 sides, Victor M802. $2.50. Four trifles, predominantly mournful, featuring solos by the clarinet, bassoon, flute, oboe. | B | AA | AA |
| *Two 16th Century Dutch Tunes.* Nat'l Symph. Orch. under Kindler. 2 sides, Victor 18071. $1. | A | A | AA |
| CONCERTOS | | | |
| **Beethoven:** *Concerto No. 3* (9 sides) & **Bach:** *Fantasia* (1 side) Iturbi (piano). Victor M801. $5.50. Iturbi's performance of this Beethoven masterwork barely challenges Schnabel's on Victor M194. | AA | A | A |
| **Mozart:** *Concerto No. 20.* Iturbi (piano). 8 sides, Victor M794. $4.50. Best recording of Mozart's most popular piano concerto. | AA | AA | AA |
| CHAMBER & INSTRUMENTAL | | | |
| **Bach:** *Italian Concerto.* Schnabel (piano). 4 sides, Victor M806. $2.50. This brilliant work deserves the sparkling harpsichord performance it gets on Musicraft 1006/7 and Victor 14232/3. | AA | AA | A |
| **Beethoven:** *Quartet No. 2.* Budapest Quartet. 6 sides, Victor M601. $3.50. If you like violin music, hear this. | AA | AA | A |
| **Brahms:** *Variations on a Theme by Haydn.* Luboshultz & Nemenoff (piano duo). 4 sides, Victor M799. $2.50. Superb Brahms. More colorful, however, is the orchestral recording of this composition on Victor M355. | AA | A | AA |
| **Dvorak:** *Quintet* (Op. 97). Prague Quartet & Kosderka. 8 sides, Victor M811. $4.50. If you like the *New World Symphony*, try this. | A | A | A |
| **Moritz:** *Sonata.* Leeson (saxophone), Wagner (piano). 6 sides, Decca Album 187. $3.50. Pleasant, unimportant saxophone music. | B | A | A |
| VOCAL | | | |
| **Schipa:** *Ave Maria* & **Liszt:** *Liebestraum.* Schipa (tenor). 2 sides, Victor 18068. $1. | B | A | AA |
| **Villa-Lobos:** *Festival of Brazilian Music.* Singers & Instrumentalists. 10 sides, Victor M773. $5.50. Inferior works of Brazil's distinguished contemporary composer. | C | AA | A |
| LIGHT & FOLK | | | |
| **Handy:** *St. Louis Blues* & Spiritual: *Go Down Moses.* Hall Johnson Choir. 2 sides, Victor 4553. 75c. | A | B | A |
| **Strauss, J:** *Wiener Blut* & *Fruhlingsstimmen Waltzes.* Phila. Orch. under Ormandy. 2 sides, Victor 18060. $1. | AA | A | AA |
| **Strauss, O:** *Chocolate Soldier—Selections.* Thomas (baritone), Manning (soprano). 2 sides, Victor 18061. $1. | A | B | A |
| **Strauss, R:** *Rosenkavalier Waltzes.* Cleveland Orch. under Rodzinski. 2 sides, Columbia 11542. $1. | AA | AA | AA |
| *A Night in Rio.* Miranda (soprano). 6 sides, Decca Album 210. $2.75. Popular tunes in the Latin-American manner sung by an extraordinary performer from Brazil. | A | AA | AA |
| *Smoky Mountain Ballads.* Mountaineers. 10 sides, Victor P79. $3. Excellent mountain music, particularly V27495. Recommended, too, for schools. | A | AA | A |
| *Hymns for Home.* Victor Chapel Choir under Cote. 6 sides, Victor P52. $2. The old favorites sung as you like them. | AA | AA | A |
| *Latin Favorites.* Vargas (tenor). 8 sides, Victor P71. $2.50. *La Paloma, Estrellita, La Golondrina,* and 5 others sung by a Mexican. | AA | AA | A |
| *Swing Low.* Hampton Institute Quartet. 8 sides, Victor P78. $2.50. Eight popular spirituals sung with too little spirit. | AA | B | AA |

# Ratings of Motion Pictures

Many people go to the movies on some particular night because they find it convenient or desirable to do so. Often they do not concern themselves very much about the particular picture they are to see. There are, on the other hand, a number of people who prefer to go only when they believe the picture being shown will be of good dramatic quality, interesting, diverting, or of historical or educational interest.

Those who wish critical comment to guide them will find useful the daily reviews published in most of the better newspapers, or the weekly or monthly reviews carried by various magazines. There are disadvantages, however, in being guided exclusively by the opinions of a single reviewer, for reviewers have their own personal outlooks, points of view, and sometimes prejudices, which tend to make them favor or frown upon particular types of films. A given reviewer may thus find highly unsatisfactory and worthy only of scorn the type of film which the average intelligent movie-goer may find diverting or interesting. Especially has this been the case since the reviewers have gone in, in a big way, for examining pictures for "social significance."

This department of the *Consumers' Digest* will endeavor to supply the critical consumer with a digest of opinion from a number of reviews, ranging from the motion picture trade press to *Parents' Magazine*, which rates motion pictures not only on their quality as entertainment, but on their suitability in various aspects for children.

It should be emphasized that the motion picture ratings which follow do not represent the judgment of a single person but are based on an analysis of the reviews appearing in 23 different periodicals. (For example, "Hold That Ghost" was recommended by 3 reviewers, rated intermediate by 1, and not recommended by 1.) These periodicals include:

*America, Baltimore Sun, Box Office, Bridgeport (Conn.) Herald, The Christian Century, The Exhibitor, Film News, Harrison's Reports, Liberty, Mademoiselle, Motion Picture Herald, National Historical Magazine, National Legion of Decency List, News Week, The New Yorker, New York Herald Tribune, New York Sun, New York Times, New York World-Telegram, Parents' Magazine, Scribner's Commentator, Successful Farming, Time, and Variety (daily).*

Periodicals will be added to this list from time to time as future exploration of the subject brings to light other journals offering critical appraisals of motion pictures which appear to be deserving of the intelligent reader's consideration.

The figures preceding the title of the picture indicate the number of critics who have been judged to rate the film **A** (recommended), **B** (intermediate), and **C** (not recommended).

Audience suitability is indicated by "A" for adults, "Y" for young people (14-18), and "C" for children, at the end of each line.

Descriptive abbreviations are as follows:

*adv*—adventure
*biog*—biography
*com*—comedy
*cri*—crime and capture of criminals
*doc*—documentary
*dr*—drama
*fan*—fantasy
*hist*—founded on historical incident
*mel*—melodrama
*mus-com*—musical comedy
*mys*—mystery
*nov*—dramatization of a novel
*rom*—romance
*soc*—social-problem drama
*trav*—travelogue
*war*—dealing with the lives of people in war time
*wes*—western

| A | B | C | | |
|---|---|---|---|---|
| — | 4 | 5 | **Aloma of the South Seas** | *romA Y* |
| — | 3 | — | **Arizona Bound** | *wesA Y* |
| — | 1 | 3 | **Among the Living** | *mysA* |
| — | 6 | 3 | **Badlands of Dakota** | *wesA Y* |
| 1 | 2 | — | **Bad Men of Missouri** | *wes-romA* |
| — | 5 | 1 | **Belle Starr** | *melA YC* |
| — | 4 | — | **Birth of the Blues** | *mus-comA Y* |
| 1 | 2 | — | **Blondie in Society** | *comA YC* |
| 1 | 1 | 3 | **Bowery Blitzkrieg** | *criA Y* |
| — | 3 | 1 | **Buy Me That Town** | *comA Y* |
| — | 3 | 2 | **Charlie Chan in Rio** | *mysA YC* |
| — | 8 | — | **Charlie's Aunt** | *comA YC* |
| 1 | 1 | 2 | **Cracked Nuts** | *comA Y* |
| — | — | 3 | **Criminals Within** | *war-criA YC* |
| — | 1 | 4 | **Deadly Game, The** | *war-melA* |
| — | 6 | 4 | **Dive Bomber** | *war-melA YC* |
| — | 1 | 3 | **Down in San Diego** | *criA Y* |
| — | 5 | — | **Dressed to Kill** | *mysA Y* |
| 1 | 4 | 1 | **Dr. Jekyll and Mr. Hyde** | *melA* |
| — | 4 | 3 | **Dr. Kildare's Wedding Day** | *drA Y* |
| — | 3 | 1 | **Dude Cowboy** | *wesA Y* |
| — | 1 | 2 | **Ellery Queen and the Perfect Crime** | *mysA YC* |
| — | 4 | 1 | **Father Takes a Wife** | *comA Y* |
| — | 6 | — | **Flying Blind** | *melA YC* |
| 1 | 2 | — | **Forgotten Village, The** | *docA* |
| — | 2 | 1 | **Fugitive Valley** | *wesA YC* |
| — | 5 | — | **Glamour Boy** | *mus-comA Y* |
| — | 1 | 3 | **Henry Aldrich for President** | *comA YC* |
| — | 3 | — | **Here Comes Mr. Jordan** | *comA Y* |
| — | 2 | 1 | **Highway West** | *melA Y* |
| 1 | 3 | — | **Hold Back the Dawn** | *melA* |
| 3 | 1 | 1 | **Hold that Ghost** | *comA YC* |
| 1 | 2 | 1 | **Hurricane Smith** | *melA Y* |
| 1 | 4 | 1 | **Ice-Capades** | *comA Y* |
| — | 3 | 3 | **International Squadron** | *war-melA Y* |
| — | 2 | 1 | **King of Dodge City** | *wesA YC* |
| — | 1 | 3 | **Law of the Tropics** | *romA* |
| — | 9 | 1 | **Life Begins for Andy Hardy** | *comA Y* |
| 2 | 5 | — | **Little Foxes, The** | *melA* |
| 1 | 4 | 2 | **Lydia** | *drA* |

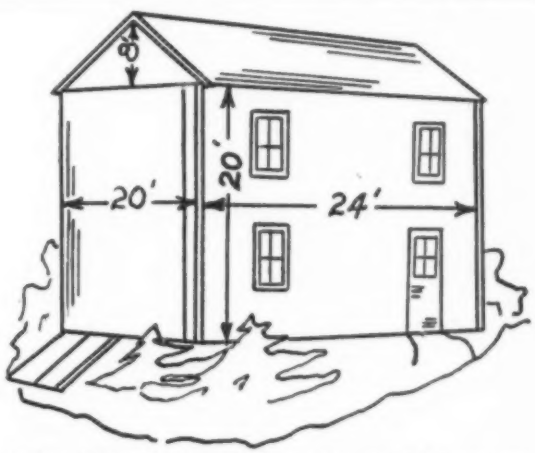
| A | B | C | | |
|---|---|---|---|---|
| 1 | 2 | — | Man from Montana | *wesA YC* |
| — | 2 | 3 | Mexican Spitfire's Baby | *comA* |
| 1 | 5 | 1 | My Life with Caroline | *comA* |
| — | 1 | 2 | Mystery Ship | *criA Y* |
| — | 2 | 2 | Navy Blues | *mus-comA Y* |
| 3 | — | 2 | New Wine | *biog-romA YC* |
| — | 2 | 2 | New York Town | *romA Y* |
| — | 5 | — | Night of January 16, The | *mysA* |
| — | 3 | 1 | Nine Lives are Not Enough | *mysA* |
| 2 | 1 | 1 | Nothing But the Truth | *comA Y* |
| — | 6 | 1 | Our Wife | *comA Y* |
| — | 1 | 2 | Parachute Battalion | *war-melA YC* |
| — | 2 | 1 | Pittsburgh Kid, The | *melA* |
| — | 1 | 4 | Private Nurse | *comA* |
| — | — | 3 | Rags to Riches | *criA Y* |
| — | 4 | 1 | Rawhide Ranger | *wesA YC* |
| — | 2 | 1 | Reg'lar Fellers | *comA YC* |
| 2 | 2 | — | Reluctant Dragon, The | *comA YC* |
| — | 3 | — | Riding the Wind | *wesA Y* |
| — | 5 | — | Ringside Maisie | *melA Y* |
| — | 1 | 2 | Roaring Frontiers | *wesA Y* |
| — | 3 | — | Scattergood Meets Broadway | *comA YC* |
| 1 | 3 | — | Sergeant York | *war-biogA YC* |
| — | 2 | 1 | Shepherd of the Hills | *novA Y* |
| — | 2 | 1 | Sing Another Chorus | *mus-comA YC* |
| 2 | 1 | — | Skylark | *comA Y* |
| — | — | 5 | Smiling Ghost, The | *mysA Y* |
| 3 | 1 | — | Stars Look Down, The | *socA Y* |
| — | 3 | — | Story of the Vatican | *docA YC* |
| — | 2 | 1 | Sunny | *mus-comA YC* |
| — | 1 | 2 | Sunset in Wyoming | *wesA YC* |
| 1 | 8 | 1 | Sun Valley Serenade | *romA Y* |
| — | 4 | — | Tanks a Million | *war-comA YC* |
| 1 | 4 | 3 | This Woman is Mine | *novA Y* |
| — | — | 4 | Three Sons O' Guns | *comA YC* |
| — | 3 | 1 | Tillie the Toiler | *comA YC* |
| 1 | 6 | — | Unfinished Business | *comA Y* |
| — | 3 | — | Voice in the Night, The | *war-melA* |
| — | 2 | 3 | West Point Widow | *drA Y* |
| — | 5 | 3 | When Ladies Meet | *drA* |
| 1 | 8 | 1 | Whistling in the Dark | *melA YC* |
| — | 3 | 3 | Wild Geese Calling | *novA* |
| — | 1 | 4 | World Premiere | *comA Y* |

# How Much Paint is Needed?

A convenient method for estimating the amount of paint needed to cover some particular building has been described by Mr. C. H. Van Vlack, extension agricultural engineer, Iowa State College, Ames, and was reported in the *Agricultural Leaders' Digest.*

In the case of a complete exterior job, points out Mr. Van Vlack, it is important first of all to calculate the area to be covered. This is easily found by measuring the distance around the house and multiplying it by the height. If the house has a gable, omit the height of the gable in making the previous calculation, and obtain the gable area by multiplying the height of the triangle of each gable by half its width. This, of course, should be added to the area of the house already calculated. Unless windows are large or numerous, it probably will not be worth while to take account of them in the calculation.

Use the spreading rate of white lead paint as a basis, and figure the number of gallons of white lead paint required for the job by dividing the total area by the number of square feet a gallon of paint will cover. "Generally," points out Mr. Van Vlack, "paint for the priming coat will cover about 650 square feet per gallon, while the second and third coats cover 700 to 750 square feet per gallon." (Both sets of figures apply to a repainting job. For new work, the correct figures are 450 and 550—see CR *Bul.* Oct. '40.)




**(20′ + 20′ + 24′ + 24′) × 20′ = 1760 square feet (area of house)**
**8′ × 10′ × 2 = 160 square feet (area of two gables)**
**1760 + 160 = 1920 square feet (total area of house)**
**1920 square feet ÷ 700 square feet per gallon = 2¾ gallons**

As Consumers' Research pointed out in the *Bulletin* for October 1940, for a finish coat, white lead should be mixed in the proportions of 100 pounds of soft paste, 3 gallons of linseed oil, and 1 pint or ½ pint of liquid paint drier according to whether raw oil or boiled oil is used. This makes slightly more than 6 gallons of white paint.

Based on this formula, a finish coat for a small building like that shown in the illustration, 20 feet wide by 24 feet long, 20 feet high to the slope of the gable, with a gable height of 8 feet, will require approximately 2¾ gallons of mixed paint, or 50 pounds of white lead paste, 1½ gallons of linseed oil, and ½ or ¼ pint of drier.